Chiral Lagrangians for singly heavy baryons to $\mathcal{O}(p^4)$ order

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The chiral Lagrangians for singly heavy baryons are constructed up to the $\mathcal{O}(p^4)$ order. The involved baryons may be in a flavor antitriplet with spin 1/2, a flavor sextet with spin 1/2, or a flavor sextet with spin 3/2 when one considers three light flavors. For the relativistic version of Lagrangian, from $\mathcal{O}(p^2)$ to $\mathcal{O}(p^4)$, there exist 48, 199, and 1242 independent terms in the $SU(2)$ case and 59, 307, and 2454 independent terms in the $SU(3)$ case, respectively. For the Lagrangian in the heavy-quark limit, from $\mathcal{O}(p^2)$ to $\mathcal{O}(p^4)$, the numbers of independent terms are reduced to 16, 64, and 412 in the $SU(2)$ case and to 17, 88, and 714 in the $SU(3)$ case, respectively. We obtain the low-energy constant relations between the relativistic case and the heavy-quark case up to the $\mathcal{O}(p^3)$ order. The relations between low-energy constants of independent relativistic terms are also presented up to this order by using the heavy-quark symmetry.

I. INTRODUCTION

More than 40 years ago, evidence for the existence of the charmed baryons Λ_c^+ and Σ_c^{++} was reported by several experiments [1–4]. Later, more and more heavy baryons were observed [5]. The theoretical study of these particles directly from QCD is a formidable challenge because of its highly nonperturbative nature. Until now, various approaches compatible with QCD have been adopted in the related studies [6], such as lattice QCD [7–10], QCD sum rule [11–15], bag model [16,17], pion mean-field approach [18], bound-state approach [19], chiral perturbation theory (ChPT) [20–28], etc.

Of the theoretical methods, ChPT as a low-energy effective field theory of QCD is a very useful tool in studying hadron properties. In this theory, Goldstone bosons generated from the spontaneous breaking of chiral symmetry are taken as the lowest pseudoscalar mesons [29–31]. For an effective theory, the physics is usually described by a Lagrangian focusing only on the low-energy degrees of freedom below some scale. The high-energy degrees of freedom are integrated out, and their effects are usually encoded in the theory parameters. In this sense, ChPT describes only physics in the energy region below the chiral symmetry-breaking scale Λ_χ. As the

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first step to establish the framework of ChPT, constructing effective Lagrangian containing necessary fields is essential. What one needs to restrict the terms in the theory is just the consideration of QCD symmetries. Picking up the independent interaction operators O_i's, one may write the Lagrangian as a sum $\mathcal{L} = \sum_i c_i O_i$. Here, the parameters c_i's are the coupling constants or low-energy constants (LECs). The effects of high-energy particles and the details of short-range QCD interactions are hidden in these parameters. With the chiral Lagrangian involving singly heavy baryons, one can study a range of problems, such as the strong CP violation [32], the properties of singly heavy baryons including magnetic moment [27,28], mass [33–36], and decay [37–39], etc.

In general, the number of terms satisfying all possible QCD symmetries are infinite, but not all of them give important contributions to the considered matrix element. Since the pion momentum p is a small quantity compared to Λ_χ, p/Λ_χ is taken to be the expansion parameter in ChPT, and the Lagrangian and matrix element are usually organized order by order with this parameter. Whether the contribution from a term is important or not relies on its chiral order. In principle, a chirally perturbative calculation involving high-order terms is better than that using only low-order terms. However, higher order implies more LECs. The determination of such LECs is one of the greatest difficulties in the application of ChPT. For ChPT with heavy-quark baryons, it is possible to reduce the number of independent LECs to a certain extent by finding out LEC relations with the heavy-quark symmetry.

The quark component of singly heavy baryons is Qqq ($Q = c, b$; $q = u, d, s$). By treating the heavy quark as a

singlet, such a baryon belongs to a $\bar{3}$ or 6 representation in the flavor $SU(3)$ group. The spins of the light diquark in $\bar{3}$ and 6 are 0 and 1, respectively, because of the requirement from the Pauli principle. Combining with the heavy-quark spin, one gets a spin-$\frac{1}{2}$ antitriplet, a spin-$\frac{1}{2}$ sextet, and a spin-$\frac{3}{2}$ sextet. In the limit that the heavy-quark mass goes to infinity, $m_Q \to \infty$, there is a heavy-quark spin symmetry [20,40–42] which says that the heavy-quark spin does not affect the baryon dynamics and, thus, the two sextets are degenerate. With this approximate symmetry, the number of LECs will be reduced to a much smaller value [21,27,28,43].

Until now, chiral Lagrangians with nucleons [44], octet baryons [45–47], $\Delta(1232)$ [48], decuplet baryons [49,50], heavy-light mesons [51], and doubly charmed baryons [52,53] have been obtained up to the $\mathcal{O}(p^4)$ order. However, only the lowest order and a part of incomplete high-order chiral Lagrangian with singly heavy baryons have been constructed [21,27,28]. In all these versions of ChPT, the two-loop contributions to amplitudes start to enter at the $\mathcal{O}(p^5)$ order. For considerations to complete the necessary ingredient of one-loop level investigations, to check convergence of chiral expansion better, to motivate future LEC studies, and so on, here we would like to construct relativistic chiral Lagrangians with singly heavy baryons up to the $\mathcal{O}(p^4)$ order. In principle, when one determines the values of LECs from experimental data, all the operators should be independent. Otherwise, overfitting would appear. The Lagrangians given in the present study will be complete, and the terms will be independent. Moreover, the Lagrangian in the heavy-quark limit will also be constructed. It will be used to find out LEC relations with the heavy-quark symmetry.

This paper is organized as follows. In Sec. II, the building blocks and multiplets of singly heavy baryons are introduced. In Sec. III, the structures of chiral Lagrangians, properties of building blocks, and some linear relations are presented. Section IV shows the method to obtain LEC relations with the heavy-quark symmetry. Section V is for the results and discussions. A brief summary is given in Sec. VI.

II. BUILDING BLOCKS FOR LAGRANGIAN CONSTRUCTION

This section collects the basic building blocks in constructing the chirally invariant terms. Their basic properties are given directly. One can find more details about them in Refs. [20,21,30,31,42,47–49,51,54–62].

A. Goldstone bosons dynamics and external sources

The QCD Lagrangian with light quarks coupling to external sources reads

$$\mathcal{L} = \mathcal{L}_{\text{QCD}}^0 + \bar{q}\gamma^\mu(v_\mu + \gamma_5 a_\mu)q + \bar{q}(i\gamma_5 p - s)q, \quad (1)$$

where $\mathcal{L}_{\text{QCD}}^0$ is the original QCD Lagrangian in the chiral limit, q denotes the light-quark field, and v_μ, a_μ, s, and p are vector, axial-vector, scalar, and pseudoscalar sources, respectively. In order to consider the electroweak interactions, v^μ is taken to be traceable in the flavor space, i.e., $\langle v^\mu \rangle \neq 0$, in the relativistic case. When the heavy-quark limit is considered, we take $\langle v^\mu \rangle \neq 0$ in the two-flavor ($N_f = 2$) case and $\langle v^\mu \rangle = 0$ in the three-flavor ($N_f = 3$) case. For the axial-vector source a^μ, it is always taken to be traceless. We do not consider the tensor external source [62] and the strong CP violation term in this paper.

The mesonic field u denotes the nonlinear representation for the pseudoscalar Goldstone bosons which are generated from the spontaneous breaking of the chiral symmetry $SU(N_f)_L \times SU(N_f)_R$ into the vector symmetry $SU(N_f)_V$. Under the $g_L \times g_R$ chiral rotation, one has

$$u \to g_L u h^\dagger = h u g_R^\dagger, \quad (2)$$

where h is a compensator field related to the pion fields.

For convenience, we choose the following building blocks to construct chiral Lagrangians [44,47–49,51]:

$$u^\mu = i\{u^\dagger(\partial^\mu - ir^\mu)u - u(\partial^\mu - il^\mu)u^\dagger\}, \quad (3)$$

$$\chi_\pm = u^\dagger \chi u^\dagger \pm u\chi^\dagger u, \quad (4)$$

$$h^{\mu\nu} = \nabla^\mu u^\nu + \nabla^\nu u^\mu, \quad (5)$$

$$f_+^{\mu\nu} = uF_L^{\mu\nu}u^\dagger + u^\dagger F_R^{\mu\nu}u, \quad (6)$$

$$f_-^{\mu\nu} = uF_L^{\mu\nu}u^\dagger - u^\dagger F_R^{\mu\nu}u = -\nabla^\mu u^\nu + \nabla^\nu u^\mu, \quad (7)$$

where $r^\mu = v^\mu + a^\mu$, $l^\mu = v^\mu - a^\mu$, $\chi = 2B_0(s + ip)$, $F_R^{\mu\nu} = \partial^\mu r^\nu - \partial^\nu r^\mu - i[r^\mu, r^\nu]$, $F_L^{\mu\nu} = \partial^\mu l^\nu - \partial^\nu l^\mu - i[l^\mu, l^\nu]$, and B_0 is a parameter related to the quark condensate. The advantage to use such notations is that the chiral rotation of an arbitrary building block X is

$$X \to X' = hXh^\dagger. \quad (8)$$

The covariant derivative of X reads

$$\nabla^\mu X = \partial^\mu X + [\Gamma^\mu, X], \quad (9)$$

$$\Gamma^\mu = \frac{1}{2}\{u^\dagger(\partial^\mu - ir^\mu)u + u(\partial^\mu - il^\mu)u^\dagger\}. \quad (10)$$

B. Singly heavy baryons

For the singly heavy baryon Qqq, the formed antitriplet (sextet) is antisymmetric (symmetric) in flavor space for the exchange of the two light quarks. One can put all the involved ground baryon fields into three matrices [21,43]:

$$B_{\bar{3}} = \begin{pmatrix} 0 & \Lambda_Q & \Xi_Q^{+1/2} \\ -\Lambda_Q & 0 & \Xi_Q^{-1/2} \\ -\Xi_Q^{+1/2} & -\Xi_Q^{-1/2} & 0 \end{pmatrix},$$

$$B_6 = \begin{pmatrix} \Sigma_Q^{+1} & \frac{1}{\sqrt{2}}\Sigma_Q^0 & \frac{1}{\sqrt{2}}\Xi_Q'^{+1/2} \\ \frac{1}{\sqrt{2}}\Sigma_Q^0 & \Sigma_Q^{-1} & \frac{1}{\sqrt{2}}\Xi_Q'^{-1/2} \\ \frac{1}{\sqrt{2}}\Xi_Q'^{+1/2} & \frac{1}{\sqrt{2}}\Xi_Q'^{-1/2} & \Omega_Q \end{pmatrix},$$

$$B_6^* = \begin{pmatrix} \Sigma_Q^{*+1} & \frac{1}{\sqrt{2}}\Sigma_Q^{*0} & \frac{1}{\sqrt{2}}\Xi_Q'^{*+1/2} \\ \frac{1}{\sqrt{2}}\Sigma_Q^{*0} & \Sigma_Q^{*-1} & \frac{1}{\sqrt{2}}\Xi_Q'^{*-1/2} \\ \frac{1}{\sqrt{2}}\Xi_Q'^{*+1/2} & \frac{1}{\sqrt{2}}\Xi_Q'^{*-1/2} & \Omega_Q^* \end{pmatrix}, \quad (11)$$

where $B_{\bar{3},6}$ (B_6^*) is for spin-1/2 (spin-3/2) baryons and the superscripts ± 1, 0, and $\pm 1/2$ denote the z components of the isospin. In the two-flavor case, only the upper left 2×2 matrices are considered.

The chiral transformations for these singly-heavy-baryon fields are

$$B \to B' = hBh^T, \quad (12)$$

$$\bar{B} \to \bar{B}' = h^*\bar{B}h^\dagger, \quad (13)$$

where $B = B_{\bar{3}}, B_6$, or B_6^*. The covariant derivative for B is

$$D_\mu B = \partial_\mu B + \Gamma_\mu B + B\Gamma_\mu^T. \quad (14)$$

If more than one covariant derivative acts on B, a totally symmetrical form is defined:

$$D^{\mu\nu\dots\rho} \equiv \frac{1}{n!}(\underbrace{D^\mu D^\nu \dots D^\rho}_{n} + \text{full permutation of } D\text{'s}). \quad (15)$$

Any antisymmetrical derivative is related to the higher-order contributions [44].

The two sextets B_6 and B_6^* have the same light degree of freedom. In the heavy-quark limit $m_Q \to \infty$, they are degenerate, and one usually puts B_6 and B_6^* baryons into a superfield ψ^μ to reflect the heavy-quark spin symmetry. In the literature, there are different relative phases between B_6 and B_6^* in the definition of ψ^μ. Here, we choose to use [28,28,63,64]

$$\psi^\mu = B_6^{*\mu} - \sqrt{\frac{1}{3}}(\gamma^\mu + v^\mu)\gamma_5 B_6,$$

$$\bar{\psi}^\mu = \bar{B}_6^{*\mu} + \sqrt{\frac{1}{3}}\bar{B}_6\gamma_5(\gamma^\mu + v^\mu), \quad (16)$$

where v^μ with $v^2 = 1$ is the velocity of heavy baryons [65]. Since the superfield describes baryons in the nonrelativistic case, it contains only the annihilation operators. Usually, the velocity-related superfield is marked by a subscript v, i.e., ψ_v^μ. In this paper, we do not show it explicitly. Under the chiral rotation, the behaviors for ψ^μ and $\bar{\psi}^\mu$ are the same as the baryon field B and $\bar{B}$, respectively. In the heavy-quark limit, the superfield satisfies the relations

$$\slashed{v}\psi^\mu = \psi^\mu, \qquad v^\mu\psi_\mu = 0. \quad (17)$$

III. CONSTRUCTION OF THE CHIRAL LAGRANGIAN FOR SINGLY HEAVY BARYONS

In this section, we introduce the method of constructing the singly-heavy-baryon chiral Lagrangian. First, we show the basic structures of the considered Lagrangian. Second, we present the transformation properties of building blocks, such as parity (P), charge conjugation (C), and Hermiticity (H.c.). Finally, we give a short description for the linear relations which are used to remove dependent terms.

A. Structures of chiral Lagrangians

Since singly heavy baryons form three types of fields, $B_{\bar{3}}$, B_6, and B_6^*, the relativistic chiral Lagrangian has six different parts:

$$\begin{aligned}
\mathcal{L} &= \mathcal{L}_{B_{\bar{3}}B_{\bar{3}}} + \mathcal{L}_{B_6B_6} + \mathcal{L}_{B_6^*B_6^*} + \mathcal{L}_{B_{\bar{3}}B_6} + \mathcal{L}_{B_{\bar{3}}B_6^*} + \mathcal{L}_{B_6B_6^*} \\
&= \sum_n C_n(\langle \bar{B}_{\bar{3}}O\Gamma DB_{\bar{3}}Q^T\rangle + \text{H.c.}) + \sum_m C_m(\langle \bar{B}_6O\Gamma DB_6Q^T\rangle + \text{H.c.}) + \sum_p C_p(\langle \bar{B}_6^*O\Gamma DB_6^*Q^T\rangle + \text{H.c.}) \\
&\quad + \sum_q C_q(\langle \bar{B}_{\bar{3}}O\Gamma DB_6Q^T\rangle + \text{H.c.}) + \sum_r C_r(\langle \bar{B}_{\bar{3}}O\Gamma DB_6^*Q^T\rangle + \text{H.c.}) + \sum_s C_s(\langle \bar{B}_6O\Gamma DB_6^*Q^T\rangle + \text{H.c.}), \quad (18)
\end{aligned}$$

where the Lorentz indices are omitted, $C_{n,m,p,q,r,s}$ are the LECs, and $\langle \cdots \rangle$ denotes the trace in the flavor space. In a Lagrangian term, Γ denotes an element in the Clifford algebra, O and Q represent all possible combinations of the building blocks, and H.c. means Hermitian conjugate. In the first three parts of the Lagrangian, we use a convention that the covariant derivative D (when it appears) acts only on the right baryon fields $B_{\bar{3}}$, B_6, and B_6^*. If a term is

Hermitian, the H.c. of that term is not needed. In the last three parts of the Lagrangian, the H.c. of a term is always needed, and we use a convention that the covariant derivative D (when it appears) acts on $B_{\bar{3}}$, B_6, or B_6^* in that term and on $\bar{B}_{\bar{3}}$, $\bar{B}_6$, or $\bar{B}_6^*$ in H.c. of that term. With such a convention, all the LECs are real. We do not show the kinetic terms in the above Lagrangian. They will be given in the leading-order Lagrangian [Eq. (30)].

In the heavy-quark limit, one has two mass terms $M_{\bar{3}}\langle \bar{B}_{\bar{3}} B_{\bar{3}}\rangle$ and $M_6\langle \bar{\psi}^\mu \psi_\mu\rangle$. The first term can be removed by scaling the baryon fields with the factor $e^{-iM_{\bar{3}} v \cdot x}$. Then the covariant derivatives acting on the matter fields $B_{\bar{3}}$ and ψ^ν become $D^\mu B_{\bar{3}} = -iM_{\bar{3}} v^\mu B_{\bar{3}}$ and $D^\mu \psi^\nu = -iM_6 v^\mu \psi^\nu$, respectively. Since the heavy-quark spin has no impact on the baryon dynamics and the light diquark has integer spin, the heavy-quark symmetry imposes a constraint on the Lagrangian which says that the Clifford algebra element in each term can be only a unit matrix. Therefore, the structures of the chiral Lagrangian in the heavy-quark limit are

$$
\begin{aligned}
\mathcal{L} &= \mathcal{L}_{B_{\bar{3}}B_{\bar{3}}} + \mathcal{L}_{B_{\bar{3}}\psi} + \mathcal{L}_{\psi\psi} \\
&= \sum_m D_m(\langle \bar{B}_{\bar{3}} Ov B_{\bar{3}} Q^T\rangle + \text{H.c.}) \\
&\quad + \sum_n D_n(\langle \bar{B}_{\bar{3}} Ov\psi Q^T\rangle + \text{H.c.}) \\
&\quad + \sum_p D_p(\langle \bar{\psi} Ov\psi Q^T\rangle + \text{H.c.}),
\end{aligned}
\tag{19}
$$

where $D_{n,m,p}$ are the relevant LECs. Other symbols are the same as those in Eq. (18) except for v which just means possible velocities from the covariant derivatives acting on baryons. The kinetic terms are also omitted, and they are given in the following Eq. (31).

B. Properties of building blocks

According to the basic idea to establish an effective field theory, the Lagrangians in Eqs. (18) and (19) should satisfy all the QCD symmetries, i.e., Lorentz symmetry, chiral symmetry, parity symmetry (P), charge conjugation symmetry (C), and time-reversal symmetry (T). With the building blocks discussed in Sec. II A, it is easy to obtain operators satisfying both Lorentz symmetry and chiral symmetry. One also needs to know the properties of building blocks in other symmetries. Because of the CPT theorem which says that a local theory is invariant under the combination of CPT operations if it is Hermitian and Lorentz invariant, one may consider only P and C behaviors of the operators in ChPT. The T invariance of the Lagrangian is automatically guaranteed by the CP invariance.

In Table I, we list the P parity, charge conjugation, Hermiticity, and chiral dimensions (dim) of the building blocks defined in Sec. II A. In Table II, the properties of Clifford algebra, Levi-Civita tensor, covariant derivative

TABLE I. Chiral dimension (dim), parity (P), charge conjugation (C), and Hermiticity (H.c.) of the building blocks.

	Dimension	P	C	Hermiticity
u^μ	1	$-u_\mu$	$(u^\mu)^T$	u^μ
$h^{\mu\nu}$	2	$-h_{\mu\nu}$	$(h^{\mu\nu})^T$	$h^{\mu\nu}$
$\chi_\pm$	2	$\pm\chi_\pm$	$(\chi_\pm)^T$	$\pm\chi_\pm$
$f_\pm^{\mu\nu}$	2	$\pm f_{\pm\mu\nu}$	$\mp (f_\pm^{\mu\nu})^T$	$f_\pm^{\mu\nu}$

TABLE II. Chiral dimension (dim), parity (P), charge conjugation (C), and Hermiticity (H.c.) of the Clifford algebra elements, Levi-Civita tensor, covariant derivative acting on baryons, and velocity of baryons. The subscripts BB and BB' are explained in the text.

	Dimension	P_{BB}	C_{BB}	H.c.$_{BB}$	$P_{BB'}$	$C_{BB'}$	H.c.$_{BB'}$
1	0	$+$	$+$	$+$	$-$	$+$	$+$
γ_5	1	$-$	$+$	$-$	$+$	$+$	$-$
γ^μ	0	$+$	$-$	$+$	$-$	$-$	$+$
$\gamma_5\gamma^\mu$	0	$-$	$+$	$+$	$+$	$+$	$+$
$\sigma^{\mu\nu}$	0	$+$	$-$	$+$	$-$	$-$	$+$
$\varepsilon^{\mu\nu\lambda\rho}$	0	$-$	$+$	$+$	$+$	$+$	$+$
D^μ	0	$+$	$-$	$-$	$+$	$+$	$+$
v^μ	0	$+$	$-$	$+$	$+$	$-$	$+$

acting on baryons, and velocity of heavy baryons are shown. We use subscript BB to denote terms in the Lagrangians $\mathcal{L}_{B_{\bar{3}}B_{\bar{3}}}$, $\mathcal{L}_{B_6B_6}$, $\mathcal{L}_{B_6^*B_6^*}$, and $\mathcal{L}_{\psi\psi}$, while BB' to denote those in $\mathcal{L}_{B_{\bar{3}}B_6}$, $\mathcal{L}_{B_{\bar{3}}B_6^*}$, $\mathcal{L}_{B_6B_6^*}$, and $\mathcal{L}_{B_{\bar{3}}\psi}$. Only signs after transformations are displayed. We give some explanations about the sign assignment by noting that the parity transformations for spin-$\frac{1}{2}$ and spin-$\frac{3}{2}$ fields are different [66] and the final Lagrangian should have the structures shown in Eq. (18) or (19). For convenience, we use the same sign for P_{BB} and $P_{BB'}$ for D^μ and v^μ but compensate a minus sign in $P_{BB'}$ for Clifford algebra and $\varepsilon^{\mu\nu\lambda\rho}$. An exception is the sign assignment for parity transformation for $\mathcal{L}_{B_{\bar{3}}B_6}$. It is taken to be the same as $\mathcal{L}_{BB}$, but not $\mathcal{L}_{BB'}$, since both $B_{\bar{3}}$ and B_6 contain only spin-$\frac{1}{2}$ fields. For charge conjugation and Hermiticity, the signs for D^μ are different between $\mathcal{L}_{BB}$ and $\mathcal{L}_{BB'}$ because of the convention adopted in Eqs. (18) and (19).

C. Linear relations

With the above recipes, terms satisfying all the symmetries can be obtained. However, these terms are not completely independent. There are linear relations restricting the constructed terms to a minimal set. They include equations of motions, Schouten identity, $SU(2)$ and $SU(3)$ Cayley-Hamilton relations, Bianchi identity, and relations about derivatives. Such relations are very similar to those for the doubly charmed baryons [53], and we do not repeat them here. The details about them have been discussed widely [21,30,31,44,47,48,48,49,54–57,67,68]. However,

now we need to consider one more relation, because the flavor multiplets of baryons are different.

The baryon antitriplet is represented by an antisymmetric matrix $B_{\bar{3}}$, and the two baryon sextets are represented by two symmetric matrices B_6 and B_6^*. In an equation form, one has

$$B_{\bar{3}}^T = -B_{\bar{3}}, \qquad (B_6^{(*)})^T = B_6^{(*)}. \qquad (20)$$

Noticing further that the trace of a matrix is equal to the trace of its transpose, one may get a new relation

$$\langle \bar{B} O \Gamma B' Q^T \rangle = \delta_B \delta_{B'} \langle \bar{B} Q \Gamma B' O^T \rangle, \qquad (21)$$

where $B^{(\prime)}$ can be $B_{\bar{3}}$, B_6, or B_6^*, $\delta_{B^{(\prime)}} = -1$ for $B_{\bar{3}}$, and $\delta_{B^{(\prime)}} = 1$ for B_6 and B_6^*.

All the nonindependent chiral-invariant terms can be eliminated with the linear relations. To do that, we adopt a programmatic approach which is almost the same as those used in Refs. [47,48,68]. The details can be found there.

IV. LEC RELATIONS IN THE HEAVY-QUARK LIMIT

In the heavy-quark limit, not all terms in the relativistic chiral Lagrangian are independent. The heavy-quark symmetry leads to some relations between the relativistic LECs. Considering the fact that one covariant derivative acting on the baryon field gives one mass scale, we revise the dimensions of operators and LECs in Eq. (18) with the new definitions

$$\tilde{O}_n = O_n / M^m, \qquad \tilde{C}_n = C_n M^m, \qquad (22)$$

where m is the number of covariant derivatives acting on the baryon field and $M = M_{\bar{3}}$. Similar to the chiral perturbation theory with explicit $\Delta(1232)$ baryons [66], where the mass difference $(m_\Delta - m_N)$ is treated as the same order as the pion momentum, we here also take $(M_6 - M_{\bar{3}}) \sim \mathcal{O}(p^1)$. With the redefined symbols, the dimensions of LECs $\tilde{C}_n$ at the $\mathcal{O}(p^n)$ order are all $(1-n)$. The Lagrangians at the order $\mathcal{O}(p^m)$ can then be written as

$$\mathcal{L}^{(m)} = \sum_n C_n^{(m)} O_n^{(m)} = \sum_n \tilde{C}_n^{(m)} \tilde{O}_n^{(m)}, \qquad N_f = 3, \quad (23)$$

$$\mathcal{L}^{(m)} = \sum_n c_n^{(m)} o_n^{(m)} = \sum_n \tilde{c}_n^{(m)} \tilde{o}_n^{(m)}, \qquad N_f = 2, \qquad (24)$$

$$\mathcal{L}_{\mathrm{HQ}}^{(m)} = \sum_n D_n^{(m)} P_n^{(m)}, \qquad N_f = 3, \qquad (25)$$

$$\mathcal{L}_{\mathrm{HQ}}^{(m)} = \sum_n d_n^{(m)} p_n^{(m)}, \qquad N_f = 2. \qquad (26)$$

We discussed two methods to get the relations between LECs for heavy-light mesons in Ref. [51]. Here, we adopt a method similar to the second one there, i.e., changing the heavy-quark form to the relativistic form. Substituting Eq. (16) into Eq. (19), one has

$$\bar{\psi}^\mu \psi_\nu \rightarrow -\frac{i}{\sqrt{3}} \bar{B}_6 \gamma_5 D^\mu B_{6\nu}^* + \frac{1}{\sqrt{3}} \bar{B}_6 \gamma_5 \gamma^\mu B_{6\nu}^*$$
$$+ \frac{i}{\sqrt{3}} \bar{B}_6^{*\mu} \gamma_5 D_\nu B_6 + \frac{1}{\sqrt{3}} \bar{B}_6^{*\mu} \gamma_5 \gamma_\nu B_6 - \frac{1}{3} g^\mu{}_\nu \bar{B}_6 B_6$$
$$- \frac{1}{3} \bar{B}_6 D^\mu{}_\nu B_6 + \frac{i}{3} \bar{B}_6 \sigma^\mu{}_\nu B_6 + \bar{B}_6^{*\mu} B_{6\nu}^*, \qquad (27)$$

$$\bar{B}_{\bar{3}} \psi^\mu \rightarrow \frac{i}{\sqrt{3}} \bar{B}_{\bar{3}} \gamma_5 D^\mu B_6 + \frac{1}{\sqrt{3}} \bar{B}_{\bar{3}} \gamma_5 \gamma^\mu B_6 + \bar{B}_{\bar{3}} B_6^{*\mu}. \qquad (28)$$

To find LEC relations, we change the forms of $O(p^m)$ order chiral Lagrangians to be

$$\mathcal{L}^{(m)} \sim \sum_k \tilde{C}_k \tilde{O}_k = \sum_{k,i} \tilde{C}_k X_{ki} A_i,$$
$$\mathcal{L}_{\mathrm{HQ}}^{(m)} \sim \sum_l D_l P_l = \sum_{l,i} D_l Y_{li} A_i, \qquad (29)$$

where A_i's are possible terms maintaining all the QCD symmetries, but they do not need to be independent. The number of A_i's is larger than those of $\tilde{O}_k$'s and P_l's, and the number of $\tilde{O}_k$'s is larger than that of P_l's. X and Y are the coefficient matrices. Using all linear relations mentioned in Sec. III C, one may pick up the independent $\tilde{O}_k$'s in the heavy-quark limit via linear algebra. Then the remaining number of $\tilde{O}_k$'s is equal to that of P_l's. The relations between $\tilde{C}_k$'s and D_l's and, thus, the relations among $\tilde{C}_k$'s can be obtained.

V. RESULTS AND DISCUSSIONS

A. $\mathcal{O}(p^1)$ and $\mathcal{O}(p^2)$ orders

The lowest-order relativistic chiral Lagrangian is [21]

$$\mathcal{L}^{(1)} = \langle \bar{B}_6 (i\!\!\not{D} - m_6) B_6 \rangle + \frac{1}{2} \langle \bar{B}_{\bar{3}} (i\!\!\not{D} - m_{\bar{3}}) B_{\bar{3}} \rangle + \langle \bar{B}_6^{*\mu} [-g_{\mu\nu}(i\!\!\not{D} - m_6^*) + i(\gamma_\mu D_\nu + \gamma_\nu D_\mu)$$
$$- \gamma_\mu (i D + m_6^*)\gamma_\nu] B_6^{*\nu} \rangle + g_1(\langle \bar{B}_6 u^\mu \gamma_5 \gamma_\mu B_6 \rangle + \text{H.c.}) + g_2(\langle \bar{B}_{\bar{3}} u^\mu \gamma_5 \gamma_\mu B_6 \rangle + \text{H.c.}) + g_3(\langle \bar{B}_6 u^\mu B_{6\mu}^* \rangle + \text{H.c.})$$
$$+ g_4(\langle \bar{B}_{\bar{3}} u^\mu B_{6\mu}^* \rangle + \text{H.c.}) + g_5 \langle \bar{B}_6^{*\mu} u^\nu \gamma_5 \gamma_\nu B_{6\mu}^* \rangle + g_6 \langle \bar{B}_{\bar{3}} u^\mu \gamma_5 \gamma_\mu B_{\bar{3}} \rangle. \qquad (30)$$

In the heavy-quark limit, the Lagrangian is [43,69]

$$\mathcal{L}_{\mathrm{HQ}}^{(1)} = \frac{i}{2}\langle \bar{B}_{\bar{3}} v \cdot D B_{\bar{3}} \rangle - i\langle \bar{\psi}^\mu v \cdot D\psi_\mu \rangle + (M_6 - M)\langle \bar{\psi}^\mu \psi_\mu \rangle$$
$$+ i d_1 \epsilon_{\mu\nu\lambda\rho}\langle \bar{\psi}^\mu v^\nu u^\lambda \psi^\rho \rangle + d_2 (\langle \bar{\psi}^\mu u_\mu B_{\bar{3}} \rangle + \mathrm{H.c.}).$$

$$(31)$$

With the heavy-quark symmetry, the relations between LECs in $\mathcal{L}^{(1)}$ and those in $\mathcal{L}_{\mathrm{HQ}}^{(1)}$ are

$$g_1 = \frac{2}{3}d_1, \qquad g_3 = \frac{1}{\sqrt{3}}d_1, \qquad g_5 = -d_1,$$
$$g_2 = -\frac{1}{\sqrt{3}}d_2, \qquad g_4 = d_2, \qquad g_6 = 0. \qquad (32)$$

These results are valid in both two- and three-flavor cases.

The relativistic chirally invariant terms at the $\mathcal{O}(p^2)$ order are shown in Table III. The second and fifth columns label the number for terms in the two- and three-flavor cases, respectively. The third and sixth columns give the relations

TABLE III. Independent terms in the relativistic Lagrangian at the $\mathcal{O}(p^2)$ order. Columns 3 and 6 list the LEC relations between the relativistic case and the heavy-quark case. Columns 4 and 7 show the LEC relations between different terms in the relativistic case by using the heavy-quark symmetry. In these two columns, "I" means that we choose the term as an independent one when employing the heavy-quark symmetry. In columns 3, 4, 6, and 7, the LEC relations marked by "*" are given in Eqs. (33)–(36), respectively. "0" means that the LECs in the heavy-quark limit vanish. "$\cdots$" means that the LEC in the heavy-quark case vanishes or is equal to that in the relativistic case.

O_n	$SU(2)$	$\tilde{c}_n^{(2)}$	$\tilde{c}_n^{(2)}$	$SU(3)$	$\tilde{C}_n^{(3)}$	$\tilde{C}_n^{(3)}$
$\langle \bar{B}_{\bar{3}} u^\mu u_\mu B_{\bar{3}} \rangle$	1	$\cdots$	$\cdots$	1	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu D_{\mu\nu} B_{\bar{3}} \rangle$	2	$\cdots$	$\cdots$	2	$\cdots$	$\cdots$
$i\langle \bar{B}_{\bar{3}} u^\mu u^\nu \sigma_{\mu\nu} B_{\bar{3}} \rangle$	3	$\cdots$	$\cdots$	3	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu B_{\bar{3}} u^T_{\ \mu} \rangle$	4	$\cdots$	$\cdots$	4	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu D_\mu^{\ \nu} B_{\bar{3}} u^T_{\ \nu} \rangle$	5	$\cdots$	$\cdots$	5	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} B_{\bar{3}} \rangle \langle u^\mu u_\mu \rangle$				6	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} D^{\mu\nu} B_{\bar{3}} \rangle \langle u_\mu u_\nu \rangle$				7	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} f_+^{\ \mu\nu} \sigma_{\mu\nu} B_{\bar{3}} \rangle$	6	$\cdots$	$\cdots$	8	$\cdots$	$\cdots$
$\langle f_+^{\ \mu\nu} \rangle \langle \bar{B}_{\bar{3}} \sigma_{\mu\nu} B_{\bar{3}} \rangle$	7	$\cdots$	$\cdots$	9	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} \chi_+ B_{\bar{3}} \rangle$	8	$\cdots$	$\cdots$	10	$\cdots$	$\cdots$
$\langle \chi_+ \rangle \langle \bar{B}_{\bar{3}} B_{\bar{3}} \rangle$	9	$\cdots$	$\cdots$	11	$\cdots$	$\cdots$
$\langle \bar{B}_6 u^\mu u_\mu B_6 \rangle$	10	*	I	12	*	I
$\langle \bar{B}_6 u^\mu u^\nu D_{\mu\nu} B_6 \rangle$	11	*	I	13	*	I
$i\langle \bar{B}_6 u^\mu u^\nu \sigma_{\mu\nu} B_6 \rangle$	12	*	I	14	*	I
$\langle \bar{B}_6 u^\mu B_6 u^T_{\ \mu} \rangle$	13	*	I	15	*	I
$\langle \bar{B}_6 u^\mu D_\mu^{\ \nu} B_6 u^T_{\ \nu} \rangle$	14	*	I	16	*	I
$\langle \bar{B}_6 B_6 \rangle \langle u^\mu u_\mu \rangle$				17	*	I
$\langle \bar{B}_6 D^{\mu\nu} B_6 \rangle \langle u_\mu u_\nu \rangle$				18	*	I
$\langle \bar{B}_6 f_+^{\ \mu\nu} \sigma_{\mu\nu} B_6 \rangle$	15	$-\frac{1}{3}d_{13}^{(2)}$	I	19	$-\frac{1}{3}D_{15}^{(2)}$	I
$\langle f_+^{\ \mu\nu} \rangle \langle \bar{B}_6 \sigma_{\mu\nu} B_6 \rangle$	16	$-\frac{1}{3}d_{14}^{(2)}$	I	20	0	0
$\langle \bar{B}_6 \chi_+ B_6 \rangle$	17	$-d_{15}^{(2)}$	I	21	$-D_{16}^{(2)}$	I
$\langle \chi_+ \rangle \langle \bar{B}_6 B_6 \rangle$	18	$-d_{16}^{(2)}$	I	22	$-D_{17}^{(2)}$	I
$\langle \bar{B}_6^{*\mu} u_\mu u^\nu B_{6\nu}^* \rangle$	19	$d_6^{(2)}$	I	23	$D_5^{(2)}$	I
$\langle \bar{B}_6^{*\mu} u^\nu u_\mu B_{6\nu}^* \rangle$	20	$d_7^{(2)}$	*	24	$D_6^{(2)}$	*
$\langle \bar{B}_6^{*\mu} u^\nu u_\nu B_{6\mu}^* \rangle$	21	$d_8^{(2)}$	*	25	$D_7^{(2)}$	*
$\langle \bar{B}_6^{*\mu} u^\nu u^\lambda D_{\nu\lambda} B_{6\mu}^* \rangle$	22	$-d_9^{(2)}$	*	26	$-D_8^{(2)}$	*
$\langle \bar{B}_6^{*\mu} u_\mu B_6^{*\nu} u^T_{\ \nu} \rangle + \mathrm{H.c.}$	23	$d_{10}^{(2)}$	I	27	$D_9^{(2)}$	I
$\langle \bar{B}_6^{*\mu} u^\nu B_{6\mu}^* u^T_{\ \nu} \rangle$	24	$d_{11}^{(2)}$	*	28	$D_{10}^{(2)}$	*

(Table continued)

TABLE III. *(Continued)*

O_n	$SU(2)$	$\tilde{c}_n^{(2)}$	$\tilde{c}_n^{(2)}$	$SU(3)$	$\tilde{C}_n^{(3)}$	$\tilde{C}_n^{(3)}$
$\langle \bar{B}_6^{*\mu} u^\nu D_\nu{}^\lambda B_{6\mu}^* u^T{}_\lambda \rangle$	25	$-d_{12}^{(2)}$	*	29	$-D_{11}^{(2)}$	*
$\langle \bar{B}_6^{*\mu} B_{6\mu}^* \rangle \langle u^\nu u_\nu \rangle$ + H.c.				30	$D_{12}^{(2)}$	I
$\langle \bar{B}_6^{*\mu} B_6^{*\nu} \rangle \langle u_\mu u_\nu \rangle$ + H.c.				31	$D_{13}^{(2)}$	*
$\langle \bar{B}_6^{*\mu} D^{\nu\lambda} B_{6\mu}^* \rangle \langle u_\nu u_\lambda \rangle$ + H.c.				32	$-D_{14}^{(2)}$	*
$i\langle \bar{B}_6^{*\mu} f_{+\mu}{}^\nu B_{6\nu}^* \rangle$	26	$d_{13}^{(2)}$	$-3\tilde{c}_{15}^{(2)}$	33	$D_{15}^{(2)}$	$-3\tilde{C}_{19}^{(2)}$
$i\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{6\mu}^* B_{6\nu}^* \rangle$	27	$d_{14}^{(2)}$	$-3\tilde{c}_{16}^{(2)}$	34	0	0
$\langle \bar{B}_6^{*\mu} \chi_+ B_{6\mu}^* \rangle$	28	$d_{15}^{(2)}$	$-\tilde{c}_{17}^{(2)}$	35	$D_{16}^{(2)}$	$-\tilde{C}_{21}^{(2)}$
$\langle \chi_+ \rangle \langle \bar{B}_6^{*\mu} B_{6\mu}^* \rangle$	29	$d_{16}^{(2)}$	$-\tilde{c}_{18}^{(2)}$	36	$D_{17}^{(2)}$	$-\tilde{C}_{22}^{(2)}$
$\langle \bar{B}_{\bar{3}} u^\mu u_\mu B_6 \rangle$ + H.c.	30	0	0	37	0	0
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu D_{\mu\nu} B_6 \rangle$ + H.c.	31	0	0	38	0	0
$i\langle \bar{B}_{\bar{3}} u^\mu u^\nu \sigma_{\mu\nu} B_6 \rangle$ + H.c.	32	$-\frac{\sqrt{3}}{3} d_1^{(2)}$	I	39	$-\frac{\sqrt{3}}{3} D_1^{(2)}$	I
$i\langle \bar{B}_{\bar{3}} u^\mu \sigma_\mu{}^\nu B_6 u^T{}_\nu \rangle$ + H.c.	33	$-\frac{\sqrt{3}}{3} d_2^{(2)}$	I	40	$-\frac{\sqrt{3}}{3} D_2^{(2)}$	I
$\langle \bar{B}_{\bar{3}} B_6 \rangle \langle u^\mu u_\mu \rangle$ + H.c.				41	0	0
$\langle \bar{B}_{\bar{3}} D^{\mu\nu} B_6 \rangle \langle u_\mu u_\nu \rangle$ + H.c.				42	0	0
$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} \gamma_5 \gamma_\mu D_\nu B_6 \rangle$ + H.c.	34	$\frac{\sqrt{3}}{3} d_3^{(2)}$	I	43	$\frac{\sqrt{3}}{3} D_3^{(2)}$	I
$\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} \sigma_{\mu\nu} B_6 \rangle$ + H.c.	35	$-\frac{\sqrt{3}}{3} d_4^{(2)}$	I	44	$-\frac{\sqrt{3}}{3} D_4^{(2)}$	I
$\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar{3}} \sigma_{\mu\nu} B_6 \rangle$ + H.c.	36	$-\frac{\sqrt{3}}{3} d_5^{(2)}$	I	45	0	0
$\langle \bar{B}_{\bar{3}} \chi_+ B_6 \rangle$ + H.c.	37	0	0	46	0	0
$\langle \chi_+ \rangle \langle \bar{B}_{\bar{3}} B_6 \rangle$ + H.c.	38	0	0	47	0	0
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\mu B_{6\nu}^* \rangle$ + H.c.	39	$d_1^{(2)}$	$-\sqrt{3}\tilde{c}_{32}^{(2)}$	48	$D_1^{(2)}$	$-\sqrt{3}\tilde{C}_{39}^{(2)}$
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\nu B_{6\mu}^* \rangle$ + H.c.	40	$-d_1^{(2)}$	$\sqrt{3}\tilde{c}_{32}^{(2)}$	49	$-D_1^{(2)}$	$\sqrt{3}\tilde{C}_{39}^{(2)}$
$\langle \bar{B}_{\bar{3}} u^\mu \gamma_5 \gamma_\mu B_6^{*\nu} u^T{}_\nu \rangle$ + H.c.	41	$2d_2^{(2)}$	$-2\sqrt{3}\tilde{c}_{33}^{(2)}$	50	$2D_2^{(2)}$	$-2\sqrt{3}\tilde{C}_{40}^{(2)}$
$\langle u^\mu u^\nu \rangle \langle \bar{B}_{\bar{3}} \gamma_5 \gamma_\mu B_{6\nu}^* \rangle$ + H.c.				51	0	0
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5 \gamma_\mu B_{6\nu}^* \rangle$ + H.c.	42	$-2d_4^{(2)}$	$2\sqrt{3}\tilde{c}_{35}^{(2)}$	52	$-2D_4^{(2)}$	$2\sqrt{3}\tilde{C}_{44}^{(2)}$
$i\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar{3}} \gamma_5 \gamma_\mu B_{6\nu}^* \rangle$ + H.c.	43	$-2d_5^{(2)}$	$2\sqrt{3}\tilde{c}_{36}^{(2)}$	53	0	0
$\langle \bar{B}_6 u^\mu u^\nu \gamma_5 \gamma_\mu B_{6\nu}^* \rangle$ + H.c.	44	$\frac{\sqrt{3}}{3} d_6^{(2)}$	$\frac{\sqrt{3}}{3} \tilde{c}_{19}^{(2)}$	54	$\frac{\sqrt{3}}{3} D_5^{(2)}$	$\frac{\sqrt{3}}{3} \tilde{C}_{23}^{(2)}$
$\langle \bar{B}_6 u^\mu u^\nu \gamma_5 \gamma_\nu B_{6\mu}^* \rangle$ + H.c.	45	$\frac{\sqrt{3}}{3} d_7^{(2)}$	*	55	$\frac{\sqrt{3}}{3} D_6^{(2)}$	*
$\langle \bar{B}_6 u^\mu \gamma_5 \gamma_\mu B_6^{*\nu} u^T{}_\nu \rangle$ + H.c.	46	$\frac{\sqrt{3}}{3} d_{10}^{(2)}$	$\frac{\sqrt{3}}{3} \tilde{c}_{23}^{(2)}$	56	$\frac{\sqrt{3}}{3} D_9^{(2)}$	$\frac{\sqrt{3}}{3} \tilde{C}_{27}^{(2)}$
$\langle u^\mu u^\nu \rangle \langle \bar{B}_6 \gamma_5 \gamma_\mu B_{6\nu}^* \rangle$ + H.c.				57	$\frac{\sqrt{3}}{3} D_{13}^{(2)}$	*
$i\langle \bar{B}_6 f_+{}^{\mu\nu} \gamma_5 \gamma_\mu B_{6\nu}^* \rangle$ + H.c.	47	$\frac{\sqrt{3}}{3} d_{13}^{(2)}$	$-\sqrt{3}\tilde{c}_{15}^{(2)}$	58	$\frac{\sqrt{3}}{3} D_{15}^{(2)}$	$-\sqrt{3}\tilde{C}_{19}^{(2)}$
$i\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_6 \gamma_5 \gamma_\mu B_{6\nu}^* \rangle$ + H.c.	48	$\frac{\sqrt{3}}{3} d_{14}^{(2)}$	$-\sqrt{3}\tilde{c}_{16}^{(2)}$	59	0	0

TABLE IV. Independent Lagrangian terms in the heavy-quark limit at the $\mathcal{O}(p^2)$ order.

P_n	$SU(2)$	$SU(3)$	P_n	$SU(2)$	$SU(3)$
$i\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu v_\lambda\psi_\rho\rangle$	1	1	$\langle\bar\psi^\mu u^\nu\psi_\mu u^T{}_\nu\rangle$	11	10
$i\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu v_\nu\psi_\lambda u^T{}_\rho\rangle$	2	2	$\langle\bar\psi^\mu u^\nu v_\nu v^\lambda\psi_\mu u^T{}_\lambda\rangle$	12	11
$i\langle\bar{B}_{\bar{3}}f_-^{\mu\nu}v_\mu\psi_\nu\rangle$	3	3	$\langle\bar\psi^\mu\psi_\mu\rangle\langle u^\nu u_\nu\rangle$		12
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}v_\lambda\psi_\rho\rangle$	4	4	$\langle\bar\psi^\mu\psi^\nu\rangle\langle u_\mu u_\nu\rangle$		13
$\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}\rangle\langle\bar{B}_{\bar{3}}v_\lambda\psi_\rho\rangle$	5		$\langle\bar\psi^\mu v^\nu v^\lambda\psi_\mu\rangle\langle u_\nu u_\lambda\rangle$		14
$\langle\bar\psi^\mu u_\mu u^\nu\psi_\nu\rangle$	6	5	$i\langle\bar\psi^\mu f_{+\mu}{}^\nu\psi_\nu\rangle$	13	15
$\langle\bar\psi^\mu u^\nu u_\mu\psi_\nu\rangle$	7	6	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar\psi_\mu\psi_\nu\rangle$	14	
$\langle\bar\psi^\mu u^\nu u_\nu\psi_\mu\rangle$	8	7	$\langle\bar\psi^\mu\chi_+\psi_\mu\rangle$	15	16
$\langle\bar\psi^\mu u^\nu u^\lambda v_\nu v_\lambda\psi_\mu\rangle$	9	8	$\langle\chi_+\rangle\langle\bar\psi^\mu\psi_\mu\rangle$	16	17
$\langle\bar\psi^\mu u_\mu\psi^\nu u^T{}_\nu\rangle$	10	9			

between relativistic LECs and the LECs in the heavy-quark limit. The fourth and seventh columns give the constraints for the relativistic LECs with the heavy-quark symmetry, where the independent ones are marked by "I." Long LEC relations are marked by "*" and those in the columns 3, 4, 6, and 7 are displayed explicitly in the following Eqs. (33)–(36), respectively. Table IV lists the Lagrangian terms in the heavy-quark limit. The $\mathcal{L}_{B_{\bar{3}}B_{\bar{3}}}$ terms are almost the same as those in Table III, except that terms containing γ matrices vanish now. Therefore, we do not show $\mathcal{L}_{B_{\bar{3}}B_{\bar{3}}}$ terms explicitly in this table. Table III does not give the LEC relations about $\mathcal{L}_{B_{\bar{3}}B_{\bar{3}}}$, either. A part of $\mathcal{O}(p^2)$ Lagrangians are given in Refs. [21,28,70], which is consistent with ours.

$$\tilde{c}^{(2)}_{10} = -\frac{1}{3}d^{(2)}_6 - \frac{1}{3}d^{(2)}_7 - d^{(2)}_8,$$

$$\tilde{c}^{(2)}_{11} = -\frac{1}{3}d^{(2)}_6 - \frac{1}{3}d^{(2)}_7 + d^{(2)}_9,$$

$$\tilde{c}^{(2)}_{12} = \frac{1}{3}d^{(2)}_6 - \frac{1}{3}d^{(2)}_7,$$

$$\tilde{c}^{(2)}_{13} = -\frac{2}{3}d^{(2)}_{10} - d^{(2)}_{11},$$

$$\tilde{c}^{(2)}_{14} = -\frac{2}{3}d^{(2)}_{10} + d^{(2)}_{12}. \tag{33}$$

$$\tilde{c}^{(2)}_{20} = -3\tilde{c}^{(2)}_{12} + \tilde{c}^{(2)}_{19},$$

$$\tilde{c}^{(2)}_{21} = -\tilde{c}^{(2)}_{10} + \tilde{c}^{(2)}_{12} - \frac{2}{3}\tilde{c}^{(2)}_{19},$$

$$\tilde{c}^{(2)}_{22} = -\tilde{c}^{(2)}_{11} + \tilde{c}^{(2)}_{12} - \frac{2}{3}\tilde{c}^{(2)}_{19},$$

$$\tilde{c}^{(2)}_{24} = -\tilde{c}^{(2)}_{13} - \frac{2}{3}\tilde{c}^{(2)}_{23},$$

$$\tilde{c}^{(2)}_{25} = -\tilde{c}^{(2)}_{14} - \frac{2}{3}\tilde{c}^{(2)}_{23},$$

$$\tilde{c}^{(2)}_{45} = -\sqrt{3}\tilde{c}^{(2)}_{12} + \frac{\sqrt{3}}{3}\tilde{c}^{(2)}_{19}. \tag{34}$$

$$\tilde{C}^{(2)}_{12} = -\frac{1}{3}D^{(2)}_5 - \frac{1}{3}D^{(2)}_6 - D^{(2)}_7,$$

$$\tilde{C}^{(2)}_{13} = -\frac{1}{3}D^{(2)}_5 - \frac{1}{3}D^{(2)}_6 + D^{(2)}_8,$$

$$\tilde{C}^{(2)}_{14} = \frac{1}{3}D^{(2)}_5 - \frac{1}{3}D^{(2)}_6,$$

$$\tilde{C}^{(2)}_{15} = -\frac{2}{3}D^{(2)}_9 - D^{(2)}_{10},$$

$$\tilde{C}^{(2)}_{16} = -\frac{2}{3}D^{(2)}_9 + D^{(2)}_{11},$$

$$\tilde{C}^{(2)}_{17} = -D^{(2)}_{12} - \frac{1}{3}D^{(2)}_{13},$$

$$\tilde{C}^{(2)}_{18} = -\frac{1}{3}D^{(2)}_{13} + D^{(2)}_{14}. \tag{35}$$

$$\tilde{C}^{(2)}_{24} = -3\tilde{C}^{(2)}_{14} + \tilde{C}^{(2)}_{23},$$

$$\tilde{C}^{(2)}_{25} = -\tilde{C}^{(2)}_{12} + \tilde{C}^{(2)}_{14} - \frac{2}{3}\tilde{C}^{(2)}_{23},$$

$$\tilde{C}^{(2)}_{26} = -\tilde{C}^{(2)}_{13} + \tilde{C}^{(2)}_{14} - \frac{2}{3}\tilde{C}^{(2)}_{23},$$

$$\tilde{C}^{(2)}_{28} = -\tilde{C}^{(2)}_{15} - \frac{2}{3}\tilde{C}^{(2)}_{27},$$

$$\tilde{C}^{(2)}_{29} = -\tilde{C}^{(2)}_{16} - \frac{2}{3}\tilde{C}^{(2)}_{27},$$

$$\tilde{C}^{(2)}_{31} = -3\tilde{C}^{(2)}_{17} - 3\tilde{C}^{(2)}_{30},$$

$$\tilde{C}^{(2)}_{32} = \tilde{C}^{(2)}_{17} - \tilde{C}^{(2)}_{18} + \tilde{C}^{(2)}_{30},$$

$$\tilde{C}^{(2)}_{55} = -\sqrt{3}\tilde{C}^{(2)}_{14} + \frac{\sqrt{3}}{3}\tilde{C}^{(2)}_{23},$$

$$\tilde{C}^{(2)}_{57} = -\sqrt{3}\tilde{C}^{(2)}_{17} - \sqrt{3}\tilde{C}^{(2)}_{30}. \tag{36}$$

B. $\mathcal{O}(p^3)$ and $\mathcal{O}(p^4)$ orders

The $\mathcal{O}(p^3)$ and $\mathcal{O}(p^4)$ order results are very long. We give them in Appendixes. Table VI in Appendix A lists the relativistic terms at the $\mathcal{O}(p^3)$ order. The contents are similar to Table III. When the obtained LEC relations are not simple, we show them in Eqs. (A1)–(A4). In Table VII, we collect the heavy-quark Lagrangian terms at the order $\mathcal{O}(p^3)$. The $\mathcal{O}(p^4)$ relativistic terms are given in Table VIII in Appendix B. For the Lagrangian in the heavy-quark limit, Table IX displays its independent terms. In the present study, we do not consider the LEC relations at the $\mathcal{O}(p^4)$ order because of the large number of terms and the computational conditions. We only mark the independent relativistic terms in columns 3, 5, 8, and 10 in Table VIII when employing the heavy-quark symmetry. The contact terms appear at this order, and they are placed at the end of each part of interaction terms in Eqs. (18) and (19).

C. Discussions

Comparing chiral Lagrangians for different baryons, one can find some similar structures. This may help us to check the results from some sides. $B_{\bar{3}}$ and B_6 differ only in the transposition property of matrices. The structures of $\mathcal{L}_{B_{\bar{3}}B_{\bar{3}}}$ and $\mathcal{L}_{B_6 B_6}$ should be similar for both two- and three-flavor cases. One may confirm this from the obtained interaction terms. The existence of transposed building blocks in part of interaction terms is a key characteristic of the singly-heavy-baryon Lagrangians. Excluding such terms, one finds that the two-flavor Lagrangians $\mathcal{L}_{B_{\bar{3}}B_{\bar{3}},B_6B_6}$ and the pion-nucleon Lagrangian [44] have the same number of independent structures. If appropriate combinations of terms are adopted, similar structures in these two cases may be further observed. In Ref. [53], we obtained chiral Lagrangians with doubly charmed baryons. Up to the $\mathcal{O}(p^3)$ order (for both two- and three-flavor cases), still excluding the terms with transposed building blocks, one finds that the structures in $\mathcal{L}_{B_{\bar{3}}B_{\bar{3}},B_6B_6}$, $\mathcal{L}_{B_6^* B_6^*}$, and $\mathcal{L}_{B_{\bar{3}}B_6^*,B_6B_6^*}$ are similar to those in $\mathcal{L}_{BB}$, $\mathcal{L}_{TT}$, and $\mathcal{L}_{BT}$, respectively, where B (T) denotes spin-$\frac{1}{2}$ (spin-$\frac{3}{2}$) doubly charmed baryon fields. For the $SU(2)$ or $SU(3)$ Lagrangians $\mathcal{L}_{B_{\bar{3}}B_6^*}$ and $\mathcal{L}_{B_6B_6^*}$, the same structures are found up to the $\mathcal{O}(p^3)$ order. At the $\mathcal{O}(p^4)$ order, however, the feature of same structure is not always true, because the symmetries of baryons are different [see Eq. (20)].

We chose the definition of the superfield [Eq. (16)] in Refs. [28,63,64]. A different choice of phase between B_6

and B_6^* may be found in the literature. It affects LEC relations involving terms in $\mathcal{L}_{B_{\bar{3}}B_6}$, $\mathcal{L}_{B_{\bar{3}}B_6^*}$, and $\mathcal{L}_{B_6B_6^*}$ but does not affect forms of obtained results and any physics.

VI. SUMMARY AND OUTLOOK

In this paper, we construct the relativistic chiral Lagrangians for singly heavy baryons to the $\mathcal{O}(p^4)$ order, including both $SU(2)$ and $SU(3)$ cases. The chiral Lagrangians in the heavy-quark limit are also obtained to this order. We collect the numbers of independent terms at each order in Table V. Using the heavy-quark symmetry, one finds that the number of independent LECs could be reduced to about $1/3$ of its original value. This symmetry may partly solve the problem that unknown LECs at high orders would affect the applications of ChPT. In the present study, we obtain LEC relations between the relativistic case and the heavy-quark-limit case up to the third chiral order. The relations among independent and nonindependent relativistic LECs are also obtained.

The studies of magnetic moments [27,28] and radiative decays [39] of singly heavy baryons have involved the $\mathcal{O}(p^4)$ order chiral Lagrangians. Now, with this order Lagrangians constructed here, one may check whether the adopted operators in these references are complete. Of course, the newly constructed Lagrangians can also serve for future studies of other quantities to the fourth chiral order which can help us to understand the convergence and power counting problem better. A natural question about LEC determination follows such studies. Although the number of independent $\mathcal{O}(p^4)$ order terms and LECs is very large, not all of them are needed in the study of a special problem. From the experience of high-order chiral studies, only several LECs or several LEC combinations are usually involved. One may turn to various theoretical methods (e.g., quark model, large N_c, and lattice QCD) to determine or constrain their values in the case that available experimental data are not enough.

In fact, the complete Lagrangians may motivate future studies of LEC determinations or LEC relations. At the leading order, the LECs can be determined with the quark model or other methods [21,28,71,72]. At higher orders, however, only few results have been obtained [28,36,39]. Since the numbers of LECs are significantly increased for high-order terms, theoretical methods to study LECs in a systematic way are welcome. In Ref. [73], an analytical method was adopted to calculate the LECs for mesonic

TABLE V. Numbers of independent terms at each chiral order.

Chiral order	Relativistic case				Heavy-quark case			
	$\mathcal{O}(p^1)$	$\mathcal{O}(p^2)$	$\mathcal{O}(p^3)$	$\mathcal{O}(p^4)$	$\mathcal{O}(p^1)$	$\mathcal{O}(p^2)$	$\mathcal{O}(p^3)$	$\mathcal{O}(p^4)$
$SU(2)$	6	48	199	1242	2	16	64	412
$SU(3)$	6	59	307	2454	2	17	88	714

chiral Lagrangians. A possible method in the present case would also be developed in future with complete and independent Lagrangians. In Refs. [74,75], we preliminarily studied the LEC relations with the help of chiral quark model up to the third chiral order, which is based on operator correspondences. In principle, such a study can be extended to any chiral order, but it needs complete Lagrangians and independent terms.

The explicit high-order Lagrangians are also helpful to improve methods to analyze the structure of chiral effective theories. It is a natural problem in ChPT how many independent structures are at a given chiral order. In the mesonic case, the authors of Ref. [76] obtained total numbers of independent terms in the chiral

Lagrangian at different orders with the help of Hilbert series techniques. They validated the results with concrete Lagrangians. Once the study in the meson-baryon case is performed, the Lagrangian constructed here would be also helpful.

APPENDIX A: $\mathcal{O}(p^3)$ ORDER RESULTS

TABLE VI. Independent terms in the relativistic Lagrangian at the $\mathcal{O}(p^3)$ order. Columns 3 and 6 list the LEC relations between the relativistic case and the heavy-quark case. Columns 4 and 7 show the LEC relations between different terms in the relativistic case by using the heavy-quark symmetry. In these two columns, "I" means that we choose the term as an independent one when employing the heavy-quark symmetry. In columns 3, 4, 6, and 7, the LEC relations marked by "*" are given in Eqs. (A1), (A2), (A3), and (A4), respectively, in this Appendix. "0" means that the LECs in the heavy-quark limit vanish. "$\cdots$" means that the LEC in the heavy-quark case vanishes or is equal to that in the relativistic case.

O_n	$SU(2)$	$\tilde{c}_n^{(2)}$	$\tilde{c}_n^{(2)}$	$SU(3)$	$\tilde{C}_n^{(3)}$	$\tilde{C}_n^{(3)}$
$\langle \bar{B}_{\bar{3}} u^\mu u_\mu u^\nu \gamma_5 \gamma_\nu B_{\bar{3}} \rangle$ + H.c.	1	$\cdots$	$\cdots$	1	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu u_\mu \gamma_5 \gamma_\nu B_{\bar{3}} \rangle$	2	$\cdots$	$\cdots$	2	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\mu D_{\nu\lambda} B_{\bar{3}} \rangle$ + H.c.	3	$\cdots$	$\cdots$	3	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\nu D_{\mu\lambda} B_{\bar{3}} \rangle$	4	$\cdots$	$\cdots$	4	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu u_\mu \gamma_5 \gamma^\nu B_{\bar{3}} u^T{}_\nu \rangle$				5	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\mu B_{\bar{3}} u^T{}_\nu \rangle$ + H.c.				6	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\mu D_\nu{}^\lambda B_{\bar{3}} u^T{}_\lambda \rangle$ + H.c.				7	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma^\lambda D_{\mu\nu} B_{\bar{3}} u^T{}_\lambda \rangle$				8	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} \gamma_5 \gamma^\mu B_{\bar{3}} \rangle \langle u_\mu u^\nu u_\nu \rangle$				9	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} \gamma_5 \gamma^\mu D^{\nu\lambda} B_{\bar{3}} \rangle \langle u_\mu u_\nu u_\lambda \rangle$				10	$\cdots$	$\cdots$
$\langle u^\mu u_\mu \rangle \langle \bar{B}_{\bar{3}} u^\nu \gamma_5 \gamma_\nu B_{\bar{3}} \rangle$				11	$\cdots$	$\cdots$
$\langle u^\mu u^\nu \rangle \langle \bar{B}_{\bar{3}} u^\lambda \gamma_5 \gamma_\mu D_{\nu\lambda} B_{\bar{3}} \rangle$				12	$\cdots$	$\cdots$
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} u_\mu u_\nu u_\lambda D_\rho B_{\bar{3}} \rangle$	5	$\cdots$	$\cdots$	13	$\cdots$	$\cdots$
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} u_\mu u_\nu D_\lambda B_{\bar{3}} u^T{}_\rho \rangle$	6	$\cdots$	$\cdots$	14	$\cdots$	$\cdots$
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} D_\mu B_{\bar{3}} \rangle \langle u_\nu u_\lambda u_\rho \rangle$				15	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu f_{-\mu}{}^\nu D_\nu B_{\bar{3}} \rangle$ + H.c.	7	$\cdots$	$\cdots$	16	$\cdots$	$\cdots$
$i\langle \bar{B}_{\bar{3}} u^\mu f_-{}^{\nu\lambda} \sigma_{\mu\nu} D_\lambda B_{\bar{3}} \rangle$ + H.c.	8	$\cdots$	$\cdots$	17	$\cdots$	$\cdots$
$i\langle \bar{B}_{\bar{3}} u^\mu f_-{}^{\nu\lambda} \sigma_{\nu\lambda} D_\mu B_{\bar{3}} \rangle$ + H.c.	9	$\cdots$	$\cdots$	18	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu h_\mu{}^\nu D_\nu B_{\bar{3}} \rangle$ + H.c.	10	$\cdots$	$\cdots$	19	$\cdots$	$\cdots$
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} D_{\mu\nu\lambda} B_{\bar{3}} \rangle$ + H.c.	11	$\cdots$	$\cdots$	20	$\cdots$	$\cdots$
$i\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} \sigma_{\mu\nu} D_\lambda B_{\bar{3}} \rangle$ + H.c.	12	$\cdots$	$\cdots$	21	$\cdots$	$\cdots$
$i\langle \bar{B}_{\bar{3}} u^\mu \sigma_\mu{}^\nu D^\lambda B_{\bar{3}} f^T_{-\nu\lambda} \rangle$	13	$\cdots$	$\cdots$	22	$\cdots$	$\cdots$
$i\langle \bar{B}_{\bar{3}} u^\mu \sigma^{\nu\lambda} D_\mu B_{\bar{3}} f^T_{-\nu\lambda} \rangle$	14	$\cdots$	$\cdots$	23	$\cdots$	$\cdots$
$i\langle u^\mu f_-{}^{\nu\lambda} \rangle \langle \bar{B}_{\bar{3}} \sigma_{\mu\nu} D_\lambda B_{\bar{3}} \rangle$				24	$\cdots$	$\cdots$
$i\langle u^\mu f_-{}^{\nu\lambda} \rangle \langle \bar{B}_{\bar{3}} \sigma_{\nu\lambda} D_\mu B_{\bar{3}} \rangle$				25	$\cdots$	$\cdots$

(Table continued)

TABLE VI. *(Continued)*

O_n	SU(2)	$\tilde{c}_n^{(2)}$	$\tilde{c}_n^{(2)}$	SU(3)	$\tilde{C}_n^{(3)}$	$\tilde{C}_n^{(3)}$
$i\langle u^\mu h^{\nu\lambda}\rangle\langle\bar{B}_{\bar{3}}\sigma_{\mu\nu}D_\lambda B_{\bar{3}}\rangle$				26	$\cdots$	$\cdots$
$\langle\bar{B}_{\bar{3}}\nabla^\mu f_{-\mu}{}^\nu\gamma_5\gamma_\nu B_{\bar{3}}\rangle$	15	$\cdots$	$\cdots$	27	$\cdots$	$\cdots$
$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u_\mu\gamma_5\gamma_\nu B_{\bar{3}}\rangle + $ H.c.	16	$\cdots$	$\cdots$	28	$\cdots$	$\cdots$
$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda\gamma_5\gamma_\mu D_{\nu\lambda}B_{\bar{3}}\rangle + $ H.c.	17	$\cdots$	$\cdots$	29	$\cdots$	$\cdots$
$i\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u_\lambda D_\rho B_{\bar{3}}\rangle + $ H.c.	18	$\cdots$	$\cdots$	30	$\cdots$	$\cdots$
$i\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}D_\lambda B_{\bar{3}}u^T{}_\rho\rangle$	19	$\cdots$	$\cdots$	31	$\cdots$	$\cdots$
$i\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}D_\mu B_{\bar{3}}\rangle\langle f_{+\nu\lambda}u_\rho\rangle$	20	$\cdots$	$\cdots$	32	$\cdots$	$\cdots$
$i\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}\rangle\langle\bar{B}_{\bar{3}}u_\lambda D_\rho B_{\bar{3}}\rangle$				33	$\cdots$	$\cdots$
$i\langle\bar{B}_{\bar{3}}\nabla^\mu f_{+\mu}{}^\nu D_\nu B_{\bar{3}}\rangle$	21	$\cdots$	$\cdots$	34	$\cdots$	$\cdots$
$i\langle\nabla^\mu f_{+\mu}{}^\nu\rangle\langle\bar{B}_{\bar{3}}D_\nu B_{\bar{3}}\rangle$	22	$\cdots$	$\cdots$	35	$\cdots$	$\cdots$
$\langle\bar{B}_{\bar{3}}u^\mu\chi_+\gamma_5\gamma_\mu B_{\bar{3}}\rangle + $ H.c.	23	$\cdots$	$\cdots$	36	$\cdots$	$\cdots$
$\langle\bar{B}_{\bar{3}}u^\mu\gamma_5\gamma_\mu B_{\bar{3}}\chi_+^T\rangle$	24	$\cdots$	$\cdots$	37	$\cdots$	$\cdots$
$\langle u^\mu\chi_+\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu B_{\bar{3}}\rangle$	25	$\cdots$	$\cdots$	38	$\cdots$	$\cdots$
$\langle\chi_+\rangle\langle\bar{B}_{\bar{3}}u^\mu\gamma_5\gamma_\mu B_{\bar{3}}\rangle$				39	$\cdots$	$\cdots$
$i\langle\bar{B}_{\bar{3}}u^\mu\chi_-D_\mu B_{\bar{3}}\rangle + $ H.c.	26	$\cdots$	$\cdots$	40	$\cdots$	$\cdots$
$i\langle\bar{B}_{\bar{3}}\nabla^\mu\chi_-\gamma_5\gamma_\mu B_{\bar{3}}\rangle$	27	$\cdots$	$\cdots$	41	$\cdots$	$\cdots$
$i\langle\nabla^\mu\chi_-\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu B_{\bar{3}}\rangle$	28	$\cdots$	$\cdots$	42	$\cdots$	$\cdots$
$\langle\bar{B}_6 u^\mu u_\mu u^\nu\gamma_5\gamma_\nu B_6\rangle + $ H.c.	29	$*$	I	43	$*$	I
$\langle\bar{B}_6 u^\mu u^\nu u_\mu\gamma_5\gamma_\nu B_6\rangle$	30	$*$	I	44	$*$	I
$\langle\bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\mu D_{\nu\lambda}B_6\rangle + $ H.c.	31	$*$	I	45	$*$	I
$\langle\bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\nu D_{\mu\lambda}B_6\rangle$	32	$*$	$-2\tilde{c}_{31}^{(3)}$	46	$*$	I
$\langle\bar{B}_6 u^\mu u_\mu\gamma_5\gamma^\nu B_6 u^T{}_\nu\rangle$				47	$*$	I
$\langle\bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\mu B_6 u^T{}_\nu\rangle + $ H.c.				48	$*$	I
$\langle\bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\mu D_\nu{}^\lambda B_6 u^T{}_\lambda\rangle + $ H.c.				49	$*$	I
$\langle\bar{B}_6 u^\mu u^\nu\gamma_5\gamma^\lambda D_{\mu\nu}B_6 u^T{}_\lambda\rangle$				50	$*$	$-2\tilde{C}_{49}^{(3)}$
$\langle\bar{B}_6\gamma_5\gamma^\mu B_6\rangle\langle u_\mu u^\nu u_\nu\rangle$				51	$*$	I
$\langle\bar{B}_6\gamma_5\gamma^\mu D^{\nu\lambda}B_6\rangle\langle u_\mu u_\nu u_\lambda\rangle$				52	$*$	$*$
$\langle u^\mu u_\mu\rangle\langle\bar{B}_6 u^\nu\gamma_5\gamma_\nu B_6\rangle$				53	$-D_{55}^{(3)}$	I
$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u^\lambda\gamma_5\gamma_\mu D_{\nu\lambda}B_6\rangle$				54	$*$	$*$
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 u_\mu u_\nu u_\lambda D_\rho B_6\rangle$	33	$*$	I	55	$*$	I
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 u_\mu u_\nu D_\lambda B_6 u^T{}_\rho\rangle$	34	$*$	I	56	$*$	I
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 D_\mu B_6\rangle\langle u_\nu u_\lambda u_\rho\rangle$				57	$-\frac{2}{3}D_{54}^{(3)}$	I
$\langle\bar{B}_6 u^\mu f_{-\mu}{}^\nu D_\nu B_6\rangle + $ H.c.	35	$*$	I	58	$*$	I
$i\langle\bar{B}_6 u^\mu f_-{}^{\nu\lambda}\sigma_{\mu\nu}D_\lambda B_6\rangle + $ H.c.	36	$*$	I	59	$*$	I
$i\langle\bar{B}_6 u^\mu f_-{}^{\nu\lambda}\sigma_{\nu\lambda}D_\mu B_6\rangle + $ H.c.	37	$-\frac{1}{3}d_{36}^{(3)}$	I	60	$-\frac{1}{3}D_{58}^{(3)}$	I
$\langle\bar{B}_6 u^\mu h_\mu{}^\nu D_\nu B_6\rangle + $ H.c.	38	$*$	I	61	$*$	I
$\langle\bar{B}_6 u^\mu h^{\nu\lambda}D_{\mu\nu\lambda}B_6\rangle + $ H.c.	39	$*$	I	62	$*$	I
$i\langle\bar{B}_6 u^\mu h^{\nu\lambda}\sigma_{\mu\nu}D_\lambda B_6\rangle + $ H.c.	40	$*$	I	63	$*$	I
$i\langle\bar{B}_6 u^\mu\sigma_\mu{}^\nu D^\lambda B_6 f^T_{-\nu\lambda}\rangle$	41	$\frac{2}{3}d_{44}^{(3)}$	I	64	$\frac{2}{3}D_{66}^{(3)}$	I
$i\langle\bar{B}_6 u^\mu\sigma^{\nu\lambda}D_\mu B_6 f^T_{-\nu\lambda}\rangle$	42	$-\frac{1}{3}d_{45}^{(3)}$	I	65	$-\frac{1}{3}D_{67}^{(3)}$	I
$i\langle u^\mu f_-{}^{\nu\lambda}\rangle\langle\bar{B}_6\sigma_{\mu\nu}D_\lambda B_6\rangle$				66	$\frac{2}{3}D_{68}^{(3)}$	I
$i\langle u^\mu f_-{}^{\nu\lambda}\rangle\langle\bar{B}_6\sigma_{\nu\lambda}D_\mu B_6\rangle$				67	$-\frac{1}{3}D_{69}^{(3)}$	I

(Table continued)

TABLE VI. *(Continued)*

O_n	$SU(2)$	$\tilde{c}_n^{(2)}$	$\tilde{c}_n^{(2)}$	$SU(3)$	$\tilde{C}_n^{(3)}$	$\tilde{C}_n^{(3)}$
$i\langle u^\mu h^{\nu\lambda}\rangle\langle \bar{B}_6\sigma_{\mu\nu}D_\lambda B_6\rangle$				68	$-\frac{2}{3}D_{70}^{(3)}$	I
$\langle \bar{B}_6\nabla^\mu f_{-\mu}{}^\nu\gamma_5\gamma_\nu B_6\rangle$	43	$-\frac{2}{3}d_{46}^{(3)}$	I	69	$-\frac{2}{3}D_{71}^{(3)}$	I
$i\langle \bar{B}_6 f_+{}^{\mu\nu}u_\mu\gamma_5\gamma_\nu B_6\rangle$ + H.c.	44	*	I	70	*	I
$i\langle \bar{B}_6 f_+{}^{\mu\nu}u^\lambda\gamma_5\gamma_\mu D_{\nu\lambda} B_6\rangle$ + H.c.	45	*	I	71	*	I
$i\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_6 f_{+\mu\nu}u_\lambda D_\rho B_6\rangle$ + H.c.	46	*	I	72	*	I
$i\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_6 f_{+\mu\nu}D_\lambda B_6 u^T{}_\rho\rangle$	47	*	I	73	*	I
$i\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_6 D_\mu B_6\rangle\langle f_{+\nu\lambda}u_\rho\rangle$	48	*	I	74	*	I
$i\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}\rangle\langle \bar{B}_6 u_\lambda D_\rho B_6\rangle$				75	0	0
$i\langle \bar{B}_6\nabla^\mu f_{+\mu}{}^\nu D_\nu B_6\rangle$	49	*	I	76	*	I
$i\langle \nabla^\mu f_{+\mu}{}^\nu\rangle\langle \bar{B}_6 D_\nu B_6\rangle$	50	*	I	77	0	0
$\langle \bar{B}_6 u^\mu\chi_+\gamma_5\gamma_\mu B_6\rangle$ + H.c.	51	$\frac{2}{3}d_{59}^{(3)}$	I	78	$\frac{2}{3}D_{82}^{(3)}$	I
$\langle \bar{B}_6 u^\mu\gamma_5\gamma_\mu B_6\chi_+^T\rangle$	52	$\frac{2}{3}d_{60}^{(3)}$	I	79	$\frac{2}{3}D_{83}^{(3)}$	I
$\langle u^\mu\chi_+\rangle\langle \bar{B}_6\gamma_5\gamma_\mu B_6\rangle$	53	$\frac{2}{3}d_{61}^{(3)}$	I	80	$\frac{2}{3}D_{84}^{(3)}$	I
$\langle\chi_+\rangle\langle \bar{B}_6 u^\mu\gamma_5\gamma_\mu B_6\rangle$				81	$\frac{2}{3}D_{85}^{(3)}$	I
$i\langle \bar{B}_6 u^\mu\chi_- D_\mu B_6\rangle$ + H.c.	54	*	I	82	*	I
$i\langle \bar{B}_6\nabla^\mu\chi_-\gamma_5\gamma_\mu B_6\rangle$	55	$-\frac{2}{3}d_{63}^{(3)}$	I	83	$-\frac{2}{3}D_{87}^{(3)}$	I
$i\langle \nabla^\mu\chi_-\rangle\langle \bar{B}_6\gamma_5\gamma_\mu B_6\rangle$	56	$\frac{2}{3}d_{64}^{(3)}$	I	84	$\frac{2}{3}D_{88}^{(3)}$	I
$\langle \bar{B}_6^{*\mu}u_\mu u^\nu u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$	57	*	I	85	*	I
$\langle \bar{B}_6^{*\mu}u_\mu u^\nu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	58	*	*	86	*	*
$\langle \bar{B}_6^{*\mu}u^\nu u_\mu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	59	*	*	87	*	*
$\langle \bar{B}_6^{*\mu}u^\nu u_\nu u^\lambda\gamma_5\gamma_\lambda B_{6\mu}^*\rangle$ + H.c.	60	*	*	88	*	*
$\langle \bar{B}_6^{*\mu}u^\nu u^\lambda u_\mu\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.				89	*	*
$\langle \bar{B}_6^{*\mu}u^\nu u^\lambda u_\nu\gamma_5\gamma_\lambda B_{6\mu}^*\rangle$	61	$2d_{30}^{(3)}$	*	90	*	*
$\langle \bar{B}_6^{*\mu}u^\nu u^\lambda u^\rho\gamma_5\gamma_\nu D_{\lambda\rho}B_{6\mu}^*\rangle$ + H.c.	62	0	0	91	0	0
$\langle \bar{B}_6^{*\mu}u_\mu u^\nu\gamma_5\gamma_\nu B_6^{*\lambda}u^T{}_\lambda\rangle$ + H.c.	63	*	*	92	*	I
$\langle \bar{B}_6^{*\mu}u_\mu u^\nu\gamma_5\gamma^\lambda B_{6\nu}^* u^T{}_\lambda\rangle$	64	$2d_{34}^{(3)}$	*	93	*	*
$\langle \bar{B}_6^{*\mu}u^\nu u_\mu\gamma_5\gamma_\nu B_6^{*\lambda}u^T{}_\lambda\rangle$ + H.c.				94	*	*
$\langle \bar{B}_6^{*\mu}u^\nu u_\mu\gamma_5\gamma^\lambda B_{6\nu}^* u^T{}_\lambda\rangle$ + H.c.				95	*	*
$\langle \bar{B}_6^{*\mu}u^\nu u_\nu\gamma_5\gamma^\lambda B_{6\mu}^* u^T{}_\lambda\rangle$ + H.c.				96	$-2D_{51}^{(3)}$	*
$\langle \bar{B}_6^{*\mu}u^\nu u^\lambda\gamma_5\gamma_\nu B_{6\mu}^* u^T{}_\lambda\rangle$ + H.c.				97	*	*
$\langle \bar{B}_6^{*\mu}u^\nu u^\lambda\gamma_5\gamma_\nu D_\lambda{}^\rho B_{6\mu}^* u^T{}_\rho\rangle$ + H.c.				98	0	0
$\langle \bar{B}_6^{*\mu}\gamma_5\gamma^\nu B_{6\mu}^*\rangle\langle u_\nu u^\lambda u_\lambda\rangle$ + H.c.				99	*	*
$\langle \bar{B}_6^{*\mu}\gamma_5\gamma^\nu B_6^{*\lambda}\rangle\langle u_\mu u_\nu u_\lambda\rangle$ + H.c.				100	*	*
$\langle \bar{B}_6^{*\mu}\gamma_5\gamma^\nu B_6^{*\lambda}\rangle\langle u_\mu u_\lambda u_\nu\rangle$ + H.c.				101	*	*
$\langle \bar{B}_6^{*\mu}\gamma_5\gamma^\nu D^{\lambda\rho}B_{6\mu}^*\rangle\langle u_\nu u_\lambda u_\rho\rangle$ + H.c.				102	0	0
$\langle u^\mu u_\mu\rangle\langle \bar{B}_6^{*\nu}u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.				103	$-\frac{3}{2}D_{56}^{(3)}$	*
$\langle u^\mu u^\nu\rangle\langle \bar{B}_{6\mu}^* u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.				104	*	*
$\langle \bar{B}_6^{*\mu}u_\mu f_-{}^{\nu\lambda}D_\nu B_{6\lambda}^*\rangle$ + H.c.	65	*	I	105	*	I
$\langle \bar{B}_6^{*\mu}u^\nu f_{-\mu}{}^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.	66	*	I	106	*	I
$\langle \bar{B}_6^{*\mu}u^\nu f_{-\mu}{}^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.	67	*	*	107	*	*
$\langle \bar{B}_6^{*\mu}u^\nu f_{-\nu}{}^\lambda D_\lambda B_{6\mu}^*\rangle$ + H.c.	68	$-d_{38}^{(3)}$	I	108	$-D_{60}^{(3)}$	I
$\langle \bar{B}_6^{*\mu}u_\mu h^{\nu\lambda}D_\nu B_{6\lambda}^*\rangle$ + H.c.	69	*	*	109	*	*

(Table continued)

TABLE VI. *(Continued)*

O_n	$SU(2)$	$\tilde{c}_n^{(2)}$	$\tilde{c}_n^{(2)}$	$SU(3)$	$\tilde{C}_n^{(3)}$	$\tilde{C}_n^{(3)}$
$\langle \bar{B}_6^{*\mu} u^\nu h_\nu^{\ \lambda} D_\lambda B_{6\mu}^* \rangle$ + H.c.	70	$-d_{42}^{(3)}$	*	110	$-D_{64}^{(3)}$	*
$\langle \bar{B}_6^{*\mu} u^\nu h^{\lambda\rho} D_{\nu\lambda\rho} B_{6\mu}^* \rangle$ + H.c.	71	$d_{43}^{(3)}$	*	111	$D_{65}^{(3)}$	*
$\langle \bar{B}_6^{*\mu} D^\nu B_6^{*\lambda} \rangle \langle u_\mu f_{-\nu\lambda} \rangle$ + H.c.				112	*	*
$\langle \bar{B}_6^{*\mu} D^\nu B_6^{*\lambda} \rangle \langle u_\nu f_{-\mu\lambda} \rangle$ + H.c.				113	*	*
$i\langle \bar{B}_6^{*\mu} f_{+\mu}^{\ \ \nu} u^\lambda \gamma_5 \gamma_\nu B_{6\lambda}^* \rangle$ + H.c.	72	*	I	114	*	I
$i\langle \bar{B}_6^{*\mu} f_{+\mu}^{\ \ \nu} u^\lambda \gamma_5 \gamma_\lambda B_{6\nu}^* \rangle$ + H.c.	73	*	*	115	$D_{74}^{(3)}$	*
$i\langle \bar{B}_6^{*\mu} f_{+}^{\ \ \nu\lambda} u_\mu \gamma_5 \gamma_\nu B_{6\lambda}^* \rangle$ + H.c.	74	*	*	116	*	*
$i\langle \bar{B}_6^{*\mu} f_{+}^{\ \ \nu\lambda} u_\nu \gamma_5 \gamma_\lambda B_{6\mu}^* \rangle$ + H.c.	75	*	*	117	*	*
$i\langle \bar{B}_6^{*\mu} f_{+\mu}^{\ \ \nu} \gamma_5 \gamma_\nu B_6^{*\lambda} u_\lambda^T \rangle$ + H.c.	76	*	I	118	*	I
$i\langle \bar{B}_6^{*\mu} f_{+\mu}^{\ \ \nu} \gamma_5 \gamma^\lambda B_{6\nu}^* u_\lambda^T \rangle$	77	$-2d_{52}^{(3)}$	*	119	$-2D_{77}^{(3)}$	*
$i\langle f_+^{\ \mu\nu} \rangle \langle \bar{B}_{6\mu}^* u^\lambda \gamma_5 \gamma_\nu B_{6\lambda}^* \rangle$ + H.c.	78	*	I	120	0	0
$i\langle f_+^{\ \mu\nu} \rangle \langle \bar{B}_{6\mu}^* u^\lambda \gamma_5 \gamma_\lambda B_{6\nu}^* \rangle$	79	$-2d_{54}^{(3)}$	*	121	0	0
$i\langle f_+^{\ \mu\nu} u^\lambda \rangle \langle \bar{B}_{6\mu}^* \gamma_5 \gamma_\nu B_{6\lambda}^* \rangle$ + H.c.				122	*	I
$i\langle f_+^{\ \mu\nu} u^\lambda \rangle \langle \bar{B}_{6\mu}^* \gamma_5 \gamma_\lambda B_{6\nu}^* \rangle$ + H.c.				123	$2D_{79}^{(3)}$	*
$i\langle \bar{B}_6^{*\mu} \nabla^\nu f_{+\nu}^{\ \ \lambda} D_\lambda B_{6\mu}^* \rangle$	80	$d_{56}^{(3)}$	I	124	$D_{81}^{(3)}$	I
$i\langle \nabla^\mu f_{+\mu}^{\ \ \nu} \rangle \langle \bar{B}_6^{*\lambda} D_\nu B_{6\lambda}^* \rangle$	81	$d_{57}^{(3)}$	I	125	0	0
$\langle \bar{B}_6^{*\mu} u^\nu \chi_+ \gamma_5 \gamma_\nu B_{6\mu}^* \rangle$ + H.c.	82	$-d_{59}^{(3)}$	$-\frac{3}{2}\tilde{c}_{51}^{(3)}$	126	$-D_{82}^{(3)}$	$-\frac{3}{2}\tilde{C}_{78}^{(3)}$
$\langle \bar{B}_6^{*\mu} u^\nu \gamma_5 \gamma_\nu B_{6\mu}^* \chi_+^T \rangle$	83	$-d_{60}^{(3)}$	$-\frac{3}{2}\tilde{c}_{52}^{(3)}$	127	$-D_{83}^{(3)}$	$-\frac{3}{2}\tilde{C}_{79}^{(3)}$
$\langle u^\mu \chi_+ \rangle \langle \bar{B}_6^{*\nu} \gamma_5 \gamma_\mu B_{6\nu}^* \rangle$ + H.c.	84	$-d_{61}^{(3)}$	$-\frac{3}{2}\tilde{c}_{53}^{(3)}$	128	$-D_{84}^{(3)}$	$-\frac{3}{2}\tilde{C}_{80}^{(3)}$
$\langle \chi_+ \rangle \langle \bar{B}_6^{*\mu} u^\nu \gamma_5 \gamma_\nu B_{6\mu}^* \rangle$ + H.c.				129	$-D_{85}^{(3)}$	$-\frac{3}{2}\tilde{C}_{81}^{(3)}$
$i\langle \bar{B}_6^{*\mu} u^\nu \chi_- D_\nu B_{6\mu}^* \rangle$ + H.c.	85	$d_{62}^{(3)}$	*	130	$D_{86}^{(3)}$	*
$i\langle \bar{B}_6^{*\mu} \nabla^\nu \chi_- \gamma_5 \gamma_\nu B_{6\mu}^* \rangle$	86	$d_{63}^{(3)}$	$-\frac{3}{2}\tilde{c}_{55}^{(3)}$	131	$D_{87}^{(3)}$	$-\frac{3}{2}\tilde{C}_{83}^{(3)}$
$i\langle \nabla^\mu \chi_- \rangle \langle \bar{B}_6^{*\nu} \gamma_5 \gamma_\mu B_{6\nu}^* \rangle$	87	$-d_{64}^{(3)}$	$-\frac{3}{2}\tilde{c}_{56}^{(3)}$	132	$-D_{88}^{(3)}$	$-\frac{3}{2}\tilde{C}_{84}^{(3)}$
$\langle \bar{B}_{\bar{3}} u^\mu u_\mu u^\nu \gamma_5 \gamma_\nu B_6 \rangle$ + H.c.	88	$\frac{\sqrt{3}}{3}d_1^{(3)}$	I	133	$\frac{\sqrt{3}}{3}D_1^{(3)}$	I
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu u_\mu \gamma_5 \gamma_\nu B_6 \rangle$ + H.c.	89	$\frac{\sqrt{3}}{3}d_2^{(3)}$	I	134	$\frac{\sqrt{3}}{3}D_2^{(3)}$	I
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu u_\nu \gamma_5 \gamma_\mu B_6 \rangle$ + H.c.				135	$\frac{\sqrt{3}}{3}D_3^{(3)}$	I
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\mu D_{\nu\lambda} B_6 \rangle$ + H.c.	90	*	I	136	*	I
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\nu D_{\mu\lambda} B_6 \rangle$ + H.c.	91	*	I	137	*	I
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\lambda D_{\mu\nu} B_6 \rangle$ + H.c.				138	*	I
$\langle \bar{B}_{\bar{3}} u^\mu u_\mu \gamma_5 \gamma^\nu B_6 u_\nu^T \rangle$ + H.c.				139	$\frac{\sqrt{3}}{3}D_7^{(3)}$	I
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\mu B_6 u_\nu^T \rangle$ + H.c.	92	$\frac{\sqrt{3}}{3}d_5^{(3)}$	I	140	$\frac{\sqrt{3}}{3}D_8^{(3)}$	I
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\nu B_6 u_\mu^T \rangle$ + H.c.				141	$\frac{\sqrt{3}}{3}D_9^{(3)}$	I
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\mu D_\nu^{\ \lambda} B_6 u_\lambda^T \rangle$ + H.c.	93	$\frac{\sqrt{3}}{3}d_6^{(3)}$	I	142	$-\frac{\sqrt{3}}{3}D_{12}^{(3)}$	I
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\nu D_\mu^{\ \lambda} B_6 u_\lambda^T \rangle$ + H.c.				143	$-\frac{\sqrt{3}}{3}D_{11}^{(3)}$	I
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma^\lambda D_{\mu\nu} B_6 u_\lambda^T \rangle$ + H.c.				144	$-\frac{\sqrt{3}}{3}D_{10}^{(3)}$	I
$\langle \bar{B}_{\bar{3}} \gamma_5 \gamma^\mu B_6 \rangle \langle u_\mu u^\nu u_\nu \rangle$ + H.c.				145	$\frac{\sqrt{3}}{3}D_{13}^{(3)}$	I
$\langle \bar{B}_{\bar{3}} \gamma_5 \gamma^\mu D^{\nu\lambda} B_6 \rangle \langle u_\mu u_\nu u_\lambda \rangle$ + H.c.				146	*	I
$\langle u^\mu u_\mu \rangle \langle \bar{B}_{\bar{3}} u^\nu \gamma_5 \gamma_\nu B_6 \rangle$ + H.c.				147	$\frac{\sqrt{3}}{3}D_{15}^{(3)}$	I
$\langle u^\mu u^\nu \rangle \langle \bar{B}_{\bar{3}} u^\lambda \gamma_5 \gamma_\mu D_{\nu\lambda} B_6 \rangle$ + H.c.				148	$\frac{2\sqrt{3}}{3}D_{16}^{(3)}$	I

(Table continued)

TABLE VI. *(Continued)*

O_n	$SU(2)$	$\tilde{c}_n^{(2)}$	$\tilde{c}_n^{(2)}$	$SU(3)$	$\tilde{C}_n^{(3)}$	$\tilde{C}_n^{(3)}$
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} u_\mu u_\nu u_\lambda D_\rho B_6\rangle$ + H.c.				149	0	0
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} u_\mu u_\nu D_\lambda B_6 u^T_\rho\rangle$ + H.c.	94	0	0	150	0	0
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} D_\mu B_6\rangle\langle u_\nu u_\lambda u_\rho\rangle$ + H.c.				151	0	0
$\langle \bar{B}_{\bar{3}} u^\mu f_{-\mu}{}^\nu D_\nu B_6\rangle$ + H.c.	95	0	0	152	0	0
$i\langle \bar{B}_{\bar{3}} u^\mu f_-{}^{\nu\lambda}\sigma_{\mu\nu} D_\lambda B_6\rangle$ + H.c.	96	*	I	153	*	I
$i\langle \bar{B}_{\bar{3}} u^\mu f_-{}^{\nu\lambda}\sigma_{\nu\lambda} D_\mu B_6\rangle$ + H.c.	97	$-\frac{\sqrt{3}}{3}d_7^{(3)}$	I	154	$-\frac{\sqrt{3}}{3}D_{17}^{(3)}$	I
$\langle \bar{B}_{\bar{3}} u^\mu h_\mu{}^\nu D_\nu B_6\rangle$ + H.c.	98	0	0	155	0	0
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} D_{\mu\nu\lambda} B_6\rangle$ + H.c.	99	0	0	156	0	0
$i\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda}\sigma_{\mu\nu} D_\lambda B_6\rangle$ + H.c.	100	$-\frac{\sqrt{3}}{3}d_9^{(3)}$	I	157	$-\frac{\sqrt{3}}{3}D_{19}^{(3)}$	I
$\langle \bar{B}_{\bar{3}} u^\mu D^\nu B_6 f^T_{-\mu\nu}\rangle$ + H.c.	101	0	0	158	0	0
$i\langle \bar{B}_{\bar{3}} u^\mu \sigma_\mu{}^\nu D^\lambda B_6 f^T_{-\nu\lambda}\rangle$ + H.c.	102	*	I	159	*	I
$i\langle \bar{B}_{\bar{3}} u^\mu \sigma^{\nu\lambda} D_\mu B_6 f^T_{-\nu\lambda}\rangle$ + H.c.	103	$-\frac{\sqrt{3}}{3}d_{10}^{(3)}$	I	160	$-\frac{\sqrt{3}}{3}D_{20}^{(3)}$	I
$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} u_\mu D_\nu B_6\rangle$ + H.c.	104	0	0	161	0	0
$i\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} u^\lambda \sigma_{\mu\nu} D_\lambda B_6\rangle$ + H.c.	105	*	I	162	*	I
$i\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} u^\lambda \sigma_{\mu\lambda} D_\nu B_6\rangle$ + H.c.	106	$\frac{2\sqrt{3}}{3}d_{12}^{(3)}$	I	163	$\frac{2\sqrt{3}}{3}D_{22}^{(3)}$	I
$\langle \bar{B}_{\bar{3}} D^\mu B_6\rangle\langle u^\nu f_{-\mu\nu}\rangle$ + H.c.				164	0	0
$i\langle u^\mu f_-{}^{\nu\lambda}\rangle\langle \bar{B}_{\bar{3}} \sigma_{\mu\nu} D_\lambda B_6\rangle$ + H.c.				165	*	I
$i\langle u^\mu f_-{}^{\nu\lambda}\rangle\langle \bar{B}_{\bar{3}} \sigma_{\nu\lambda} D_\mu B_6\rangle$ + H.c.				166	$\frac{\sqrt{3}}{3}D_{24}^{(3)}$	I
$i\langle u^\mu h^{\nu\lambda}\rangle\langle \bar{B}_{\bar{3}} \sigma_{\mu\nu} D_\lambda B_6\rangle$ + H.c.				167	$-\frac{\sqrt{3}}{3}D_{26}^{(3)}$	I
$\langle \bar{B}_{\bar{3}} \nabla^\mu f_{-\mu}{}^\nu \gamma_5\gamma_\nu B_6\rangle$ + H.c.	107	$\frac{\sqrt{3}}{3}d_{14}^{(3)}$	I	168	$\frac{\sqrt{3}}{3}D_{27}^{(3)}$	I
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} u_\mu \gamma_5\gamma_\nu B_6\rangle$ + H.c.	108	*	I	169	$\frac{\sqrt{3}}{3}D_{28}^{(3)}$	I
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} u^\lambda \gamma_5\gamma_\mu D_{\nu\lambda} B_6\rangle$ + H.c.	109	*	I	170	$\frac{\sqrt{3}}{3}D_{29}^{(3)}$	I
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma_\mu B_6 u^T_\nu\rangle$ + H.c.	110	$\frac{\sqrt{3}}{3}d_{17}^{(3)}$	I	171	$\frac{\sqrt{3}}{3}D_{30}^{(3)}$	I
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma_\mu D_\nu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.	111	$\frac{\sqrt{3}}{3}d_{18}^{(3)}$	I	172	$\frac{\sqrt{3}}{3}D_{31}^{(3)}$	I
$i\langle \bar{B}_{\bar{3}} u^\mu f_+{}_\mu{}^\nu \gamma_5\gamma_\nu B_6\rangle$ + H.c.	112	*	I	173	$\frac{\sqrt{3}}{3}D_{32}^{(3)}$	I
$i\langle \bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} \gamma_5\gamma_\nu D_{\mu\lambda} B_6\rangle$ + H.c.	113	*	I	174	$\frac{\sqrt{3}}{3}D_{33}^{(3)}$	I
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} u_\mu \gamma_5\gamma_\nu B_6\rangle$ + H.c.	114	$\frac{\sqrt{3}}{3}d_{21}^{(3)}$	I	175	0	0
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} u^\lambda \gamma_5\gamma_\mu D_{\nu\lambda} B_6\rangle$ + H.c.	115	$-\frac{\sqrt{3}}{3}d_{22}^{(3)}$	I	176	0	0
$i\langle f_+{}^{\mu\nu} u_\mu\rangle\langle \bar{B}_{\bar{3}} \gamma_5\gamma_\nu B_6\rangle$ + H.c.				177	$-\frac{\sqrt{3}}{3}D_{34}^{(3)}$	I
$i\langle f_+{}^{\mu\nu} u^\lambda\rangle\langle \bar{B}_{\bar{3}} \gamma_5\gamma_\mu D_{\nu\lambda} B_6\rangle$ + H.c.				178	$\frac{\sqrt{3}}{3}D_{35}^{(3)}$	I
$i\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} f_{+\mu\nu} u_\lambda D_\rho B_6\rangle$ + H.c.	116	0	0	179	0	0
$i\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} f_{+\mu\nu} D_\lambda B_6 u^T_\rho\rangle$ + H.c.	117	0	0	180	0	0
$i\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} u_\mu f_{+\nu\lambda} D_\rho B_6\rangle$ + H.c.	118	0	0	181	0	0
$i\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} D_\mu B_6\rangle\langle f_{+\nu\lambda} u_\rho\rangle$ + H.c.	119	0	0	182	0	0
$i\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}\rangle\langle \bar{B}_{\bar{3}} u_\lambda D_\rho B_6\rangle$ + H.c.				183	0	0
$i\langle \bar{B}_{\bar{3}} \nabla^\mu f_{+\mu}{}^\nu D_\nu B_6\rangle$ + H.c.	120	0	0	184	0	0
$i\langle \nabla^\mu f_{+\mu}{}^\nu\rangle\langle \bar{B}_{\bar{3}} D_\nu B_6\rangle$ + H.c.	121	0	0	185	0	0
$\langle \bar{B}_{\bar{3}} u^\mu \chi_+ \gamma_5\gamma_\mu B_6\rangle$ + H.c.	122	$\frac{\sqrt{3}}{3}d_{23}^{(3)}$	I	186	$\frac{\sqrt{3}}{3}D_{36}^{(3)}$	I
$\langle \bar{B}_{\bar{3}} u^\mu \gamma_5\gamma_\mu B_6 \chi_+^T\rangle$ + H.c.	123	$\frac{\sqrt{3}}{3}d_{24}^{(3)}$	I	187	$\frac{\sqrt{3}}{3}D_{37}^{(3)}$	I
$\langle \bar{B}_{\bar{3}} \chi_+ u^\mu \gamma_5\gamma_\mu B_6\rangle$ + H.c.	124	$\frac{\sqrt{3}}{3}d_{25}^{(3)}$	I	188	$\frac{\sqrt{3}}{3}D_{38}^{(3)}$	I
$\langle u^\mu \chi_+\rangle\langle \bar{B}_{\bar{3}} \gamma_5\gamma_\mu B_6\rangle$ + H.c.	125	$\frac{\sqrt{3}}{3}d_{26}^{(3)}$	I	189	$\frac{\sqrt{3}}{3}D_{39}^{(3)}$	I

(Table continued)

TABLE VI. *(Continued)*

O_n	$SU(2)$	$\tilde{c}_n^{(2)}$	$\tilde{c}_n^{(2)}$	$SU(3)$	$\tilde{C}_n^{(3)}$	$\tilde{C}_n^{(3)}$
$\langle\chi_+\rangle\langle\bar{B}_{\bar{3}}u^\mu\gamma_5\gamma_\mu B_6\rangle$ + H.c.				190	$\frac{\sqrt{3}}{3}D_{40}^{(3)}$	I
$i\langle\bar{B}_{\bar{3}}u^\mu\chi_-D_\mu B_6\rangle$ + H.c.	126	0	0	191	0	0
$i\langle\bar{B}_{\bar{3}}u^\mu D_\mu B_6\chi_-^T\rangle$ + H.c.	127	0	0	192	0	0
$i\langle\bar{B}_{\bar{3}}\chi_-u^\mu D_\mu B_6\rangle$ + H.c.	128	0	0	193	0	0
$i\langle\bar{B}_{\bar{3}}D^\mu B_6\rangle\langle u_\mu\chi_-\rangle$ + H.c.	129	0	0	194	0	0
$i\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}u^\mu D_\mu B_6\rangle$ + H.c.				195	0	0
$i\langle\bar{B}_{\bar{3}}\nabla^\mu\chi_-\gamma_5\gamma_\mu B_6\rangle$ + H.c.	130	$\frac{\sqrt{3}}{3}d_{27}^{(3)}$	I	196	$\frac{\sqrt{3}}{3}D_{41}^{(3)}$	I
$i\langle\nabla^\mu\chi_-\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu B_6\rangle$ + H.c.	131	$\frac{\sqrt{3}}{3}d_{28}^{(3)}$	I	197	$\frac{\sqrt{3}}{3}D_{42}^{(3)}$	I
$\langle\bar{B}_{\bar{3}}u^\mu u_\mu u^\nu B_{6\nu}^*\rangle$ + H.c.	132	$d_1^{(3)}$	$\sqrt{3}\tilde{c}_{88}^{(3)}$	198	$D_1^{(3)}$	$\sqrt{3}\tilde{C}_{133}^{(3)}$
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u_\mu B_{6\nu}^*\rangle$ + H.c.	133	$d_2^{(3)}$	$\sqrt{3}\tilde{c}_{89}^{(3)}$	199	$D_2^{(3)}$	$\sqrt{3}\tilde{C}_{134}^{(3)}$
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u_\nu B_{6\mu}^*\rangle$ + H.c.				200	$D_3^{(3)}$	$\sqrt{3}\tilde{C}_{135}^{(3)}$
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u^\lambda D_{\mu\nu}B_{6\lambda}^*\rangle$ + H.c.	134	*	*	201	*	*
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u^\lambda D_{\mu\lambda}B_{6\nu}^*\rangle$ + H.c.	135	*	*	202	*	*
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u^\lambda D_{\nu\lambda}B_{6\mu}^*\rangle$ + H.c.				203	*	*
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu u^\lambda\sigma_{\mu\nu}B_{6\lambda}^*\rangle$ + H.c.	136	0	0	204	0	0
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu u^\lambda\sigma_{\mu\lambda}B_{6\nu}^*\rangle$ + H.c.				205	0	0
$\langle\bar{B}_{\bar{3}}u^\mu u_\mu B_6^{*\nu}u^T_{\ \nu}\rangle$ + H.c.				206	$D_7^{(3)}$	$\sqrt{3}\tilde{C}_{139}^{(3)}$
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu B_{6\mu}^*u^T_{\ \nu}\rangle$ + H.c.	137	$d_5^{(3)}$	$\sqrt{3}\tilde{c}_{92}^{(3)}$	207	$D_8^{(3)}$	$\sqrt{3}\tilde{C}_{140}^{(3)}$
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu B_{6\nu}^*u^T_{\ \mu}\rangle$ + H.c.				208	$D_9^{(3)}$	$\sqrt{3}\tilde{C}_{141}^{(3)}$
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu D_{\mu\nu}B_6^{*\lambda}u^T_{\ \lambda}\rangle$ + H.c.				209	$-D_{10}^{(3)}$	$\sqrt{3}\tilde{C}_{144}^{(3)}$
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu D_\mu^{\ \lambda}B_{6\nu}^*u^T_{\ \lambda}\rangle$ + H.c.	138	$-d_6^{(3)}$	$-\sqrt{3}\tilde{c}_{93}^{(3)}$	210	$-D_{11}^{(3)}$	$\sqrt{3}\tilde{C}_{143}^{(3)}$
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu D_\nu^{\ \lambda}B_{6\mu}^*u^T_{\ \lambda}\rangle$ + H.c.				211	$-D_{12}^{(3)}$	$\sqrt{3}\tilde{C}_{142}^{(3)}$
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu\sigma_{\mu\nu}B_6^{*\lambda}u^T_{\ \lambda}\rangle$ + H.c.	139	0	0	212	0	0
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu\sigma_\mu^{\ \lambda}B_{6\nu}^*u^T_{\ \lambda}\rangle$ + H.c.				213	0	0
$\langle\bar{B}_{\bar{3}}B_6^{*\mu}\rangle\langle u_\mu u^\nu u_\nu\rangle$ + H.c.				214	$D_{13}^{(3)}$	$\sqrt{3}\tilde{C}_{145}^{(3)}$
$\langle\bar{B}_{\bar{3}}D^{\mu\nu}B_6^{*\lambda}\rangle\langle u_\mu u_\nu u_\lambda\rangle$ + H.c.				215	$-D_{14}^{(3)}$	*
$\langle u^\mu u_\mu\rangle\langle\bar{B}_{\bar{3}}u^\nu B_{6\nu}^*\rangle$ + H.c.				216	$D_{15}^{(3)}$	$\sqrt{3}\tilde{C}_{147}^{(3)}$
$\langle u^\mu u^\nu\rangle\langle\bar{B}_{\bar{3}}u^\lambda D_{\mu\nu}B_{6\lambda}^*\rangle$ + H.c.				217	$-D_{16}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{C}_{148}^{(3)}$
$i\langle u^\mu u^\nu\rangle\langle\bar{B}_{\bar{3}}u^\lambda\sigma_{\mu\lambda}B_{6\nu}^*\rangle$ + H.c.				218	0	0
$\langle\bar{B}_{\bar{3}}u^\mu f_-^{\ \nu\lambda}\gamma_5\gamma_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.	140	*	$\sqrt{3}\tilde{c}_{96}^{(3)}$	219	*	$\sqrt{3}\tilde{C}_{153}^{(3)}$
$\langle\bar{B}_{\bar{3}}u^\mu f_-^{\ \nu\lambda}\gamma_5\gamma_\nu D_\mu B_{6\lambda}^*\rangle$ + H.c.	141	*	*	220	*	*
$\langle\bar{B}_{\bar{3}}u^\mu f_-^{\ \nu\lambda}\gamma_5\gamma_\nu D_\lambda B_{6\mu}^*\rangle$ + H.c.	142	*	*	221	*	*
$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}\gamma_5\gamma_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.	143	$d_9^{(3)}$	$-\sqrt{3}\tilde{c}_{100}^{(3)}$	222	$D_{19}^{(3)}$	$-\sqrt{3}\tilde{C}_{157}^{(3)}$
$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}\gamma_5\gamma_\nu D_\mu B_{6\lambda}^*\rangle$ + H.c.	144	$d_{12}^{(3)}$	$\frac{\sqrt{3}}{2}\tilde{c}_{106}^{(3)}$	223	$D_{22}^{(3)}$	$\frac{\sqrt{3}}{2}\tilde{C}_{163}^{(3)}$
$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_{6\mu}^*\rangle$ + H.c.	145	*	*	224	*	*
$\langle\bar{B}_{\bar{3}}u^\mu\gamma_5\gamma^\nu D_\mu B_6^{*\lambda}f_{-\nu\lambda}^T\rangle$ + H.c.	146	$2d_{10}^{(3)}$	$-2\sqrt{3}\tilde{c}_{103}^{(3)}$	225	$2D_{20}^{(3)}$	$-2\sqrt{3}\tilde{C}_{160}^{(3)}$
$\langle\bar{B}_{\bar{3}}u^\mu\gamma_5\gamma^\nu D^\lambda B_{6\mu}^*f_{-\nu\lambda}^T\rangle$ + H.c.	147	*	$\sqrt{3}\tilde{c}_{102}^{(3)}$	226	*	$\sqrt{3}\tilde{C}_{159}^{(3)}$
$\langle\bar{B}_{\bar{3}}f_-^{\ \mu\nu}u^\lambda\gamma_5\gamma_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.	148	$-2d_{12}^{(3)}$	$-\sqrt{3}\tilde{c}_{106}^{(3)}$	227	$-2D_{22}^{(3)}$	$-\sqrt{3}\tilde{C}_{163}^{(3)}$

(Table continued)

TABLE VI. *(Continued)*

O_n	$SU(2)$	$\tilde{c}_n^{(2)}$	$\tilde{c}_n^{(2)}$	$SU(3)$	$\tilde{C}_n^{(3)}$	$\tilde{C}_n^{(3)}$
$\langle \bar{B}_{\bar{3}} f_{-}{}^{\mu\nu} u^\lambda \gamma_5 \gamma_\mu D_\lambda B^*_{6\nu} \rangle$ + H.c.	149	*	$-2\sqrt{3}\tilde{c}_{105}^{(3)}$	228	*	$-2\sqrt{3}\tilde{C}_{162}^{(3)}$
$\langle u^\mu f_{-}{}^{\nu\lambda} \rangle \langle \bar{B}_{\bar{3}} \gamma_5 \gamma_\mu D_\nu B^*_{6\lambda} \rangle$ + H.c.				229	*	*
$\langle u^\mu f_{-}{}^{\nu\lambda} \rangle \langle \bar{B}_{\bar{3}} \gamma_5 \gamma_\nu D_\mu B^*_{6\lambda} \rangle$ + H.c.				230	$-2D_{24}^{(3)}$	$-2\sqrt{3}\tilde{C}_{166}^{(3)}$
$\langle u^\mu f_{-}{}^{\nu\lambda} \rangle \langle \bar{B}_{\bar{3}} \gamma_5 \gamma_\nu D_\lambda B^*_{6\mu} \rangle$ + H.c.				231	*	*
$\langle u^\mu h^{\nu\lambda} \rangle \langle \bar{B}_{\bar{3}} \gamma_5 \gamma_\mu D_\nu B^*_{6\lambda} \rangle$ + H.c.				232	$2D_{26}^{(3)}$	$-2\sqrt{3}\tilde{C}_{167}^{(3)}$
$\langle \bar{B}_{\bar{3}} \nabla^\mu f_{-\mu}{}^\nu B^*_{6\nu} \rangle$ + H.c.	150	$d_{14}^{(3)}$	$\sqrt{3}\tilde{c}_{107}^{(3)}$	233	$D_{27}^{(3)}$	$\sqrt{3}\tilde{C}_{168}^{(3)}$
$i\langle \bar{B}_{\bar{3}} f_{+}{}^{\mu\nu} u_\mu B^*_{6\nu} \rangle$ + H.c.	151	$d_{15}^{(3)}$	*	234	$D_{28}^{(3)}$	$\sqrt{3}\tilde{C}_{169}^{(3)}$
$i\langle \bar{B}_{\bar{3}} f_{+}{}^{\mu\nu} u^\lambda D_{\mu\lambda} B^*_{6\nu} \rangle$ + H.c.	152	*	*	235	*	*
$\langle \bar{B}_{\bar{3}} f_{+}{}^{\mu\nu} u^\lambda \sigma_{\mu\nu} B^*_{6\lambda} \rangle$ + H.c.	153	0	0	236	0	0
$i\langle \bar{B}_{\bar{3}} f_{+}{}^{\mu\nu} B^*_{6\mu} u^T{}_\nu \rangle$ + H.c.	154	$d_{17}^{(3)}$	$\sqrt{3}\tilde{c}_{110}^{(3)}$	237	$D_{30}^{(3)}$	$\sqrt{3}\tilde{C}_{171}^{(3)}$
$i\langle \bar{B}_{\bar{3}} f_{+}{}^{\mu\nu} D_\mu{}^\lambda B^*_{6\nu} u^T{}_\lambda \rangle$ + H.c.	155	$-d_{18}^{(3)}$	$-\sqrt{3}\tilde{c}_{111}^{(3)}$	238	$-D_{31}^{(3)}$	$-\sqrt{3}\tilde{C}_{172}^{(3)}$
$\langle \bar{B}_{\bar{3}} f_{+}{}^{\mu\nu} \sigma_{\mu\nu} B_6^{*\lambda} u^T{}_\lambda \rangle$ + H.c.	156	0	0	239	0	0
$i\langle \bar{B}_{\bar{3}} u^\mu f_{+\mu}{}^\nu B^*_{6\nu} \rangle$ + H.c.	157	$d_{19}^{(3)}$	*	240	$D_{32}^{(3)}$	$\sqrt{3}\tilde{C}_{173}^{(3)}$
$\langle \bar{B}_{\bar{3}} u^\mu f_{+}{}^{\nu\lambda} \sigma_{\mu\nu} B^*_{6\lambda} \rangle$ + H.c.	158	0	0	241	0	0
$i\langle \bar{B}_{\bar{3}} B_6^{*\mu} \rangle \langle f_{+\mu}{}^\nu u_\nu \rangle$ + H.c.	159	$d_{21}^{(3)}$	$\sqrt{3}\tilde{c}_{114}^{(3)}$	242	$D_{34}^{(3)}$	$-\sqrt{3}\tilde{C}_{177}^{(3)}$
$i\langle \bar{B}_{\bar{3}} D^{\mu\nu} B_6^{*\lambda} \rangle \langle f_{+\mu\lambda} u_\nu \rangle$ + H.c.	160	$-d_{22}^{(3)}$	$\sqrt{3}\tilde{c}_{115}^{(3)}$	243	$-D_{35}^{(3)}$	$-\sqrt{3}\tilde{C}_{178}^{(3)}$
$i\langle f_{+}{}^{\mu\nu} \rangle \langle \bar{B}_{\bar{3}} u_\mu B^*_{6\nu} \rangle$ + H.c.				244	0	0
$i\langle f_{+}{}^{\mu\nu} \rangle \langle \bar{B}_{\bar{3}} u^\lambda D_{\mu\lambda} B^*_{6\nu} \rangle$ + H.c.				245	0	0
$\langle f_{+}{}^{\mu\nu} \rangle \langle \bar{B}_{\bar{3}} u^\lambda \sigma_{\mu\nu} B^*_{6\lambda} \rangle$ + H.c.	161	0	0	246	0	0
$\langle f_{+}{}^{\mu\nu} u^\lambda \rangle \langle \bar{B}_{\bar{3}} \sigma_{\mu\nu} B^*_{6\lambda} \rangle$ + H.c.				247	0	0
$\langle \bar{B}_{\bar{3}} u^\mu \chi_{+} B^*_{6\mu} \rangle$ + H.c.	162	$d_{23}^{(3)}$	$\sqrt{3}\tilde{c}_{122}^{(3)}$	248	$D_{36}^{(3)}$	$\sqrt{3}\tilde{C}_{186}^{(3)}$
$\langle \bar{B}_{\bar{3}} u^\mu B^*_{6\mu} \chi_{+}^T \rangle$ + H.c.	163	$d_{24}^{(3)}$	$\sqrt{3}\tilde{c}_{123}^{(3)}$	249	$D_{37}^{(3)}$	$\sqrt{3}\tilde{C}_{187}^{(3)}$
$\langle \bar{B}_{\bar{3}} \chi_{+} u^\mu B^*_{6\mu} \rangle$ + H.c.	164	$d_{25}^{(3)}$	$\sqrt{3}\tilde{c}_{124}^{(3)}$	250	$D_{38}^{(3)}$	$\sqrt{3}\tilde{C}_{188}^{(3)}$
$\langle \bar{B}_{\bar{3}} B_6^{*\mu} \rangle \langle u_\mu \chi_{+} \rangle$ + H.c.	165	$d_{26}^{(3)}$	$\sqrt{3}\tilde{c}_{125}^{(3)}$	251	$D_{39}^{(3)}$	$\sqrt{3}\tilde{C}_{189}^{(3)}$
$\langle \chi_{+} \rangle \langle \bar{B}_{\bar{3}} u^\mu B^*_{6\mu} \rangle$ + H.c.				252	$D_{40}^{(3)}$	$\sqrt{3}\tilde{C}_{190}^{(3)}$
$\langle \bar{B}_6 u^\mu u_\mu u^\nu B^*_{6\nu} \rangle$ + H.c.	166	*	*	253	*	*
$\langle \bar{B}_6 u^\mu u^\nu u_\mu B^*_{6\nu} \rangle$ + H.c.	167	*	*	254	*	$-\frac{\sqrt{3}}{2}\tilde{C}_{44}^{(3)}$
$\langle \bar{B}_6 u^\mu u^\nu u_\nu B^*_{6\mu} \rangle$ + H.c.				255	*	*
$\langle \bar{B}_6 u^\mu u^\nu u^\lambda D_{\mu\nu} B^*_{6\lambda} \rangle$ + H.c.	168	*	*	256	*	*
$\langle \bar{B}_6 u^\mu u^\nu u^\lambda D_{\mu\lambda} B^*_{6\nu} \rangle$ + H.c.	169	*	*	257	*	*
$\langle \bar{B}_6 u^\mu u^\nu u^\lambda D_{\nu\lambda} B^*_{6\mu} \rangle$ + H.c.				258	*	*
$i\langle \bar{B}_6 u^\mu u^\nu u^\lambda \sigma_{\mu\nu} B^*_{6\lambda} \rangle$ + H.c.	170	0	0	259	0	0
$i\langle \bar{B}_6 u^\mu u^\nu u^\lambda \sigma_{\mu\lambda} B^*_{6\nu} \rangle$ + H.c.				260	*	*
$\langle \bar{B}_6 u^\mu u_\mu B_6^{*\nu} u^T{}_\nu \rangle$ + H.c.				261	*	$-\frac{\sqrt{3}}{2}\tilde{C}_{47}^{(3)}$
$\langle \bar{B}_6 u^\mu u^\nu B^*_{6\mu} u^T{}_\nu \rangle$ + H.c.	171	*	*	262	*	*
$\langle \bar{B}_6 u^\mu u^\nu B^*_{6\nu} u^T{}_\mu \rangle$ + H.c.				263	*	*
$\langle \bar{B}_6 u^\mu u^\nu D_{\mu\nu} B_6^{*\lambda} u^T{}_\lambda \rangle$ + H.c.				264	*	$\sqrt{3}\tilde{C}_{49}^{(3)}$
$\langle \bar{B}_6 u^\mu u^\nu D_\mu{}^\lambda B^*_{6\nu} u^T{}_\lambda \rangle$ + H.c.	172	*	*	265	*	*
$\langle \bar{B}_6 u^\mu u^\nu D_\nu{}^\lambda B^*_{6\mu} u^T{}_\lambda \rangle$ + H.c.				266	*	*
$i\langle \bar{B}_6 u^\mu u^\nu \sigma_{\mu\nu} B_6^{*\lambda} u^T{}_\lambda \rangle$ + H.c.	173	*	*	267	*	*

(Table continued)

TABLE VI. *(Continued)*

O_n	$SU(2)$	$\tilde{c}_n^{(2)}$	$\tilde{c}_n^{(2)}$	$SU(3)$	$\tilde{C}_n^{(3)}$	$\tilde{C}_n^{(3)}$
$i\langle\bar{B}_6 u^\mu u^\nu \sigma_\mu{}^\lambda B_{6\nu}^* u_\lambda^T\rangle$ + H.c.				268	0	0
$\langle\bar{B}_6 B_6^{*\mu}\rangle\langle u_\mu u^\nu u_\nu\rangle$ + H.c.				269	*	$-\frac{\sqrt{3}}{2}\tilde{C}_{51}^{(3)}$
$\langle\bar{B}_6 D^{\mu\nu} B_6^{*\lambda}\rangle\langle u_\mu u_\nu u_\lambda\rangle$ + H.c.				270	*	*
$\langle u^\mu u_\mu\rangle\langle\bar{B}_6 u^\nu B_{6\nu}^*\rangle$ + H.c.				271	$\frac{\sqrt{3}}{2}D_{55}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{C}_{53}^{(3)}$
$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u^\lambda D_{\mu\nu} B_{6\lambda}^*\rangle$ + H.c.				272	*	*
$i\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u^\lambda \sigma_{\mu\lambda} B_{6\nu}^*\rangle$ + H.c.				273	0	0
$\langle\bar{B}_6 u^\mu f_-{}^{\nu\lambda}\gamma_5\gamma_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.	174	*	*	274	*	*
$\langle\bar{B}_6 u^\mu f_-{}^{\nu\lambda}\gamma_5\gamma_\nu D_\mu B_{6\lambda}^*\rangle$ + H.c.	175	*	*	275	*	*
$\langle\bar{B}_6 u^\mu f_-{}^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_{6\mu}^*\rangle$ + H.c.	176	*	*	276	*	*
$\langle\bar{B}_6 u^\mu h^{\nu\lambda}\gamma_5\gamma_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.	177	*	*	277	*	*
$\langle\bar{B}_6 u^\mu h^{\nu\lambda}\gamma_5\gamma_\nu D_\mu B_{6\lambda}^*\rangle$ + H.c.	178	*	*	278	*	*
$\langle\bar{B}_6 u^\mu h^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_{6\mu}^*\rangle$ + H.c.	179	*	*	279	*	*
$\langle\bar{B}_6 u^\mu\gamma_5\gamma^\nu D_\mu B_6^{*\lambda} f_{-\nu\lambda}^T\rangle$ + H.c.	180	$-\frac{\sqrt{3}}{3}d_{45}^{(3)}$	$\sqrt{3}\tilde{c}_{42}^{(3)}$	280	$-\frac{\sqrt{3}}{3}D_{67}^{(3)}$	$\sqrt{3}\tilde{C}_{65}^{(3)}$
$\langle\bar{B}_6 u^\mu\gamma_5\gamma^\nu D^\lambda B_{6\mu}^* f_{-\nu\lambda}^T\rangle$ + H.c.	181	$-\frac{\sqrt{3}}{3}d_{44}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{c}_{41}^{(3)}$	281	$-\frac{\sqrt{3}}{3}D_{66}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{C}_{64}^{(3)}$
$\langle\bar{B}_6 f_-{}^{\mu\nu}u^\lambda\gamma_5\gamma_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.	182	*	*	282	*	*
$\langle\bar{B}_6 f_-{}^{\mu\nu}u^\lambda\gamma_5\gamma_\mu D_\lambda B_{6\nu}^*\rangle$ + H.c.	183	*	*	283	*	*
$\langle u^\mu f_-{}^{\nu\lambda}\rangle\langle\bar{B}_6\gamma_5\gamma_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.				284	*	*
$\langle u^\mu f_-{}^{\nu\lambda}\rangle\langle\bar{B}_6\gamma_5\gamma_\nu D_\mu B_{6\lambda}^*\rangle$ + H.c.				285	$-\frac{\sqrt{3}}{3}D_{69}^{(3)}$	$\sqrt{3}\tilde{C}_{67}^{(3)}$
$\langle u^\mu f_-{}^{\nu\lambda}\rangle\langle\bar{B}_6\gamma_5\gamma_\nu D_\lambda B_{6\mu}^*\rangle$ + H.c.				286	*	*
$\langle u^\mu h^{\nu\lambda}\rangle\langle\bar{B}_6\gamma_5\gamma_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.				287	$-\frac{2\sqrt{3}}{3}D_{70}^{(3)}$	$\sqrt{3}\tilde{C}_{68}^{(3)}$
$\langle\bar{B}_6 \nabla^\mu f_{-\mu}{}^\nu B_{6\nu}^*\rangle$ + H.c.	184	$\frac{\sqrt{3}}{3}d_{46}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{c}_{43}^{(3)}$	288	$\frac{\sqrt{3}}{3}D_{71}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{C}_{69}^{(3)}$
$i\langle\bar{B}_6 f_+{}^{\mu\nu}u_\mu B_{6\nu}^*\rangle$ + H.c.	185	$-\frac{\sqrt{3}}{3}d_{50}^{(3)}$	*	289	$-\frac{\sqrt{3}}{3}D_{75}^{(3)}$	*
$i\langle\bar{B}_6 f_+{}^{\mu\nu}u^\lambda D_{\mu\lambda} B_{6\nu}^*\rangle$ + H.c.	186	*	*	290	*	*
$\langle\bar{B}_6 f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\nu} B_{6\lambda}^*\rangle$ + H.c.	187	*	*	291	*	*
$i\langle\bar{B}_6 f_+{}^{\mu\nu}B_{6\mu}^* u_\nu^T\rangle$ + H.c.	188	*	*	292	*	*
$i\langle\bar{B}_6 f_+{}^{\mu\nu}D_\mu{}^\lambda B_{6\nu}^* u_\lambda^T\rangle$ + H.c.	189	*	*	293	*	*
$\langle\bar{B}_6 f_+{}^{\mu\nu}\sigma_{\mu\nu}B_6^{*\lambda}u_\lambda^T\rangle$ + H.c.	190	*	*	294	*	*
$i\langle\bar{B}_6 u^\mu f_{+\mu}{}^\nu B_{6\nu}^*\rangle$ + H.c.	191	*	*	295	*	*
$\langle\bar{B}_6 u^\mu f_+{}^{\nu\lambda}\sigma_{\mu\nu}B_{6\lambda}^*\rangle$ + H.c.	192	*	*	296	*	*
$i\langle\bar{B}_6 B_6^{*\mu}\rangle\langle f_{+\mu}{}^\nu u_\nu\rangle$ + H.c.	193	*	*	297	*	*
$i\langle\bar{B}_6 D^{\mu\nu}B_6^{*\lambda}\rangle\langle f_{+\mu\lambda}u_\nu\rangle$ + H.c.	194	*	*	298	*	*
$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u_\mu B_{6\nu}^*\rangle$ + H.c.				299	0	0
$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda D_{\mu\lambda}B_{6\nu}^*\rangle$ + H.c.				300	0	0
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda\sigma_{\mu\nu}B_{6\lambda}^*\rangle$ + H.c.	195	*	*	301	0	0
$\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_6\sigma_{\mu\nu}B_{6\lambda}^*\rangle$ + H.c.				302	*	*
$\langle\bar{B}_6 u^\mu\chi_+ B_{6\mu}^*\rangle$ + H.c.	196	$-\frac{\sqrt{3}}{3}d_{59}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{c}_{51}^{(3)}$	303	$-\frac{\sqrt{3}}{3}D_{82}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{C}_{78}^{(3)}$
$\langle\bar{B}_6 u^\mu B_{6\mu}^*\chi_+^T\rangle$ + H.c.	197	$-\frac{\sqrt{3}}{3}d_{60}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{c}_{52}^{(3)}$	304	$-\frac{\sqrt{3}}{3}D_{83}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{C}_{79}^{(3)}$
$\langle\bar{B}_6\chi_+ u^\mu B_{6\mu}^*\rangle$ + H.c.	198	$-\frac{\sqrt{3}}{3}d_{59}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{c}_{51}^{(3)}$	305	$-\frac{\sqrt{3}}{3}D_{82}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{C}_{78}^{(3)}$
$\langle\bar{B}_6 B_6^{*\mu}\rangle\langle u_\mu\chi_+\rangle$ + H.c.	199	$-\frac{\sqrt{3}}{3}d_{61}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{c}_{53}^{(3)}$	306	$-\frac{\sqrt{3}}{3}D_{84}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{C}_{80}^{(3)}$
$\langle\chi_+\rangle\langle\bar{B}_6 u^\mu B_{6\mu}^*\rangle$ + H.c.				307	$-\frac{\sqrt{3}}{3}D_{85}^{(3)}$	$-\frac{\sqrt{3}}{2}\tilde{C}_{81}^{(3)}$

$$\tilde{c}_{29}^{(3)} = -\frac{1}{3}d_{29}^{(3)} + \frac{2}{3}d_{32}^{(3)} - \frac{1}{6}d_{34}^{(3)}, \quad \tilde{c}_{30}^{(3)} = \frac{2}{3}d_{29}^{(3)} + \frac{1}{3}d_{34}^{(3)}, \quad \tilde{c}_{31}^{(3)} = -\frac{1}{3}d_{29}^{(3)} - \frac{2}{3}d_{30}^{(3)} - \frac{1}{6}d_{34}^{(3)}, \quad \tilde{c}_{32}^{(3)} = \frac{2}{3}d_{29}^{(3)} + \frac{4}{3}d_{30}^{(3)} + \frac{1}{3}d_{34}^{(3)},$$

$$\tilde{c}_{33}^{(3)} = \frac{2}{3}d_{29}^{(3)} - \frac{2}{3}d_{31}^{(3)}, \quad \tilde{c}_{34}^{(3)} = -\frac{2}{3}d_{33}^{(3)} - \frac{2}{3}d_{34}^{(3)}, \quad \tilde{c}_{35}^{(3)} = -\frac{1}{3}d_{35}^{(3)} + \frac{1}{3}d_{37}^{(3)} + d_{38}^{(3)}, \quad \tilde{c}_{36}^{(3)} = \frac{1}{3}d_{35}^{(3)} + \frac{1}{3}d_{37}^{(3)}, \quad \tilde{c}_{38}^{(3)} = \frac{1}{3}d_{39}^{(3)} + \frac{1}{3}d_{41}^{(3)} + d_{42}^{(3)},$$

$$\tilde{c}_{39}^{(3)} = \frac{1}{3}d_{39}^{(3)} + \frac{1}{3}d_{40}^{(3)} + \frac{1}{3}d_{41}^{(3)} - d_{43}^{(3)}, \quad \tilde{c}_{40}^{(3)} = -\frac{1}{3}d_{39}^{(3)} + \frac{1}{3}d_{41}^{(3)}, \quad \tilde{c}_{44}^{(3)} = -\frac{2}{3}d_{47}^{(3)} - \frac{1}{3}d_{49}^{(3)} + \frac{2}{3}d_{50}^{(3)}, \quad \tilde{c}_{45}^{(3)} = \frac{2}{3}d_{47}^{(3)} + \frac{4}{3}d_{48}^{(3)} + \frac{1}{3}d_{49}^{(3)},$$

$$\tilde{c}_{46}^{(3)} = -\frac{1}{3}d_{47}^{(3)} + \frac{1}{3}d_{49}^{(3)}, \quad \tilde{c}_{47}^{(3)} = \frac{2}{3}d_{51}^{(3)} + \frac{2}{3}d_{52}^{(3)}, \quad \tilde{c}_{48}^{(3)} = \frac{2}{3}d_{53}^{(3)} - \frac{2}{3}d_{54}^{(3)}, \quad \tilde{c}_{49}^{(3)} = \frac{2}{3}d_{55}^{(3)} - d_{56}^{(3)},$$

$$\tilde{c}_{50}^{(3)} = -d_{57}^{(3)} + \frac{2}{3}d_{58}^{(3)}, \quad \tilde{c}_{54}^{(3)} = \frac{1}{3}d_{40}^{(3)} - d_{62}^{(3)}, \quad \tilde{c}_{57}^{(3)} = -2d_{29}^{(3)} - 4d_{30}^{(3)} + 2d_{33}^{(3)}, \quad \tilde{c}_{58}^{(3)} = d_{29}^{(3)} - d_{31}^{(3)} + d_{33}^{(3)},$$

$$\tilde{c}_{59}^{(3)} = 2d_{30}^{(3)} + d_{31}^{(3)}, \quad \tilde{c}_{60}^{(3)} = -d_{30}^{(3)} - d_{32}^{(3)}, \quad \tilde{c}_{63}^{(3)} = -2d_{33}^{(3)} - d_{34}^{(3)}, \quad \tilde{c}_{65}^{(3)} = -d_{35}^{(3)} - d_{40}^{(3)} - d_{41}^{(3)},$$

$$\tilde{c}_{66}^{(3)} = -d_{36}^{(3)} - d_{40}^{(3)} - 2d_{41}^{(3)}, \quad \tilde{c}_{67}^{(3)} = -d_{37}^{(3)} - d_{41}^{(3)}, \quad \tilde{c}_{69}^{(3)} = -d_{39}^{(3)} - d_{40}^{(3)} - d_{41}^{(3)}, \quad \tilde{c}_{72}^{(3)} = 2d_{47}^{(3)} + 2d_{48}^{(3)} + 2d_{53}^{(3)} - d_{54}^{(3)},$$

$$\tilde{c}_{73}^{(3)} = d_{49}^{(3)} + 2d_{54}^{(3)}, \quad \tilde{c}_{74}^{(3)} = -2d_{48}^{(3)} - d_{49}^{(3)} + 2d_{53}^{(3)} - d_{54}^{(3)}, \quad \tilde{c}_{75}^{(3)} = -2d_{48}^{(3)} - d_{50}^{(3)}, \quad \tilde{c}_{76}^{(3)} = 2d_{51}^{(3)} + d_{52}^{(3)},$$

$$\tilde{c}_{78}^{(3)} = -2d_{53}^{(3)} + d_{54}^{(3)}, \quad \tilde{c}_{90}^{(3)} = -\frac{\sqrt{3}}{3}d_{3}^{(3)} + \frac{\sqrt{3}}{3}d_{6}^{(3)}, \quad \tilde{c}_{91}^{(3)} = -\frac{\sqrt{3}}{3}d_{4}^{(3)} + \frac{\sqrt{3}}{3}d_{6}^{(3)}, \quad \tilde{c}_{96}^{(3)} = -\frac{2\sqrt{3}}{3}d_{7}^{(3)} - \frac{\sqrt{3}}{3}d_{8}^{(3)},$$

$$\tilde{c}_{102}^{(3)} = -\frac{2\sqrt{3}}{3}d_{10}^{(3)} - \frac{\sqrt{3}}{3}d_{11}^{(3)}, \quad \tilde{c}_{105}^{(3)} = -\frac{\sqrt{3}}{3}d_{12}^{(3)} - \frac{\sqrt{3}}{3}d_{13}^{(3)}, \quad \tilde{c}_{108}^{(3)} = \frac{\sqrt{3}}{3}d_{15}^{(3)} - \frac{\sqrt{3}}{3}d_{21}^{(3)}, \quad \tilde{c}_{109}^{(3)} = \frac{\sqrt{3}}{3}d_{16}^{(3)} + \frac{\sqrt{3}}{3}d_{22}^{(3)},$$

$$\tilde{c}_{112}^{(3)} = \frac{\sqrt{3}}{3}d_{19}^{(3)} - \frac{\sqrt{3}}{3}d_{21}^{(3)}, \quad \tilde{c}_{113}^{(3)} = \frac{\sqrt{3}}{3}d_{20}^{(3)} + \frac{\sqrt{3}}{3}d_{22}^{(3)}, \quad \tilde{c}_{134}^{(3)} = -d_{3}^{(3)} - d_{20}^{(3)}, \quad \tilde{c}_{135}^{(3)} = -d_{4}^{(3)} + d_{20}^{(3)},$$

$$\tilde{c}_{140}^{(3)} = -2d_{7}^{(3)} - d_{8}^{(3)}, \quad \tilde{c}_{141}^{(3)} = 2d_{7}^{(3)} + d_{12}^{(3)}, \quad \tilde{c}_{142}^{(3)} = -2d_{7}^{(3)} - d_{8}^{(3)} - d_{12}^{(3)}, \quad \tilde{c}_{145}^{(3)} = -d_{9}^{(3)} - d_{12}^{(3)},$$

$$\tilde{c}_{147}^{(3)} = -2d_{10}^{(3)} - d_{11}^{(3)}, \quad \tilde{c}_{149}^{(3)} = 2d_{12}^{(3)} + 2d_{13}^{(3)}, \quad \tilde{c}_{152}^{(3)} = -d_{16}^{(3)} - d_{20}^{(3)}, \quad \tilde{c}_{166}^{(3)} = \frac{\sqrt{3}}{3}d_{29}^{(3)} - \frac{2\sqrt{3}}{3}d_{32}^{(3)} + \frac{\sqrt{3}}{3}d_{33}^{(3)},$$

$$\tilde{c}_{167}^{(3)} = -\frac{\sqrt{3}}{3}d_{29}^{(3)} + \frac{\sqrt{3}}{3}d_{33}^{(3)} - \frac{\sqrt{3}}{3}d_{34}^{(3)}, \quad \tilde{c}_{168}^{(3)} = \frac{\sqrt{3}}{3}d_{29}^{(3)} + \frac{2\sqrt{3}}{3}d_{30}^{(3)} - \frac{\sqrt{3}}{3}d_{33}^{(3)} + \frac{\sqrt{3}}{3}d_{34}^{(3)} - \frac{2\sqrt{3}}{3}d_{47}^{(3)} - \frac{2\sqrt{3}}{3}d_{48}^{(3)} - \frac{\sqrt{3}}{3}d_{49}^{(3)},$$

$$\tilde{c}_{169}^{(3)} = -\frac{\sqrt{3}}{3}d_{29}^{(3)} - \frac{2\sqrt{3}}{3}d_{30}^{(3)} - \frac{\sqrt{3}}{3}d_{33}^{(3)} + \frac{2\sqrt{3}}{3}d_{47}^{(3)} + \frac{2\sqrt{3}}{3}d_{48}^{(3)} + \frac{\sqrt{3}}{3}d_{49}^{(3)}, \quad \tilde{c}_{171}^{(3)} = -\frac{2\sqrt{3}}{3}d_{33}^{(3)} + \frac{\sqrt{3}}{3}d_{34}^{(3)},$$

$$\tilde{c}_{172}^{(3)} = \frac{2\sqrt{3}}{3}d_{33}^{(3)} - \frac{\sqrt{3}}{3}d_{34}^{(3)}, \quad \tilde{c}_{173}^{(3)} = \frac{2\sqrt{3}}{3}d_{33}^{(3)} - \frac{\sqrt{3}}{3}d_{34}^{(3)}, \quad \tilde{c}_{174}^{(3)} = -\frac{\sqrt{3}}{3}d_{35}^{(3)} + \frac{\sqrt{3}}{3}d_{39}^{(3)} - \frac{\sqrt{3}}{3}d_{40}^{(3)} + \frac{\sqrt{3}}{6}d_{55}^{(3)},$$

$$\tilde{c}_{175}^{(3)} = -\frac{\sqrt{3}}{3}d_{36}^{(3)} + \frac{\sqrt{3}}{6}d_{37}^{(3)} - \frac{\sqrt{3}}{6}d_{41}^{(3)} - \frac{\sqrt{3}}{12}d_{55}^{(3)}, \quad \tilde{c}_{176}^{(3)} = -\frac{\sqrt{3}}{2}d_{37}^{(3)} - \frac{\sqrt{3}}{6}d_{41}^{(3)} + \frac{\sqrt{3}}{12}d_{55}^{(3)}, \quad \tilde{c}_{177}^{(3)} = -\frac{2\sqrt{3}}{3}d_{39}^{(3)} - \frac{\sqrt{3}}{3}d_{40}^{(3)},$$

$$\tilde{c}_{178}^{(3)} = \frac{\sqrt{3}}{6}d_{37}^{(3)} - \frac{\sqrt{3}}{3}d_{40}^{(3)} - \frac{\sqrt{3}}{6}d_{41}^{(3)} + \frac{\sqrt{3}}{12}d_{55}^{(3)}, \quad \tilde{c}_{179}^{(3)} = -\frac{\sqrt{3}}{6}d_{37}^{(3)} - \frac{\sqrt{3}}{2}d_{41}^{(3)} - \frac{\sqrt{3}}{12}d_{55}^{(3)}, \quad \tilde{c}_{182}^{(3)} = -\frac{\sqrt{3}}{3}d_{35}^{(3)} - \frac{\sqrt{3}}{3}d_{39}^{(3)} - \frac{\sqrt{3}}{6}d_{55}^{(3)},$$

$$\tilde{c}_{183}^{(3)} = -\frac{\sqrt{3}}{3}d_{36}^{(3)} - \frac{\sqrt{3}}{3}d_{40}^{(3)} + \frac{\sqrt{3}}{6}d_{55}^{(3)}, \quad \tilde{c}_{186}^{(3)} = -\frac{2\sqrt{3}}{3}d_{47}^{(3)} - \frac{\sqrt{3}}{3}d_{49}^{(3)}, \quad \tilde{c}_{187}^{(3)} = \frac{\sqrt{3}}{3}d_{47}^{(3)} + \frac{\sqrt{3}}{6}d_{49}^{(3)} + \frac{2\sqrt{3}}{3}d_{53}^{(3)} + \frac{\sqrt{3}}{3}d_{54}^{(3)},$$

$$\tilde{c}_{188}^{(3)} = \frac{2\sqrt{3}}{3}d_{51}^{(3)} - \frac{\sqrt{3}}{3}d_{52}^{(3)}, \quad \tilde{c}_{189}^{(3)} = -\frac{2\sqrt{3}}{3}d_{51}^{(3)} + \frac{\sqrt{3}}{3}d_{52}^{(3)}, \quad \tilde{c}_{190}^{(3)} = \frac{2\sqrt{3}}{3}d_{51}^{(3)} - \frac{\sqrt{3}}{3}d_{52}^{(3)}, \quad \tilde{c}_{191}^{(3)} = -\frac{2\sqrt{3}}{3}d_{47}^{(3)} - \frac{\sqrt{3}}{3}d_{49}^{(3)} + \frac{\sqrt{3}}{3}d_{50}^{(3)},$$

$$\tilde{c}_{192}^{(3)} = -\frac{2\sqrt{3}}{3}d_{47}^{(3)} - \frac{\sqrt{3}}{3}d_{49}^{(3)} - \frac{4\sqrt{3}}{3}d_{53}^{(3)} - \frac{2\sqrt{3}}{3}d_{54}^{(3)}, \quad \tilde{c}_{193}^{(3)} = \frac{2\sqrt{3}}{3}d_{53}^{(3)} + \frac{\sqrt{3}}{3}d_{54}^{(3)},$$

$$\tilde{c}_{194}^{(3)} = -\frac{2\sqrt{3}}{3}d_{53}^{(3)} - \frac{\sqrt{3}}{3}d_{54}^{(3)}, \quad \tilde{c}_{195}^{(3)} = -\frac{2\sqrt{3}}{3}d_{53}^{(3)} - \frac{\sqrt{3}}{3}d_{54}^{(3)}. \tag{A1}$$

$$\tilde{c}_{58}^{(3)} = -6\tilde{c}_{31}^{(3)} + \frac{3}{2}\tilde{c}_{33}^{(3)} + \frac{3}{2}\tilde{c}_{34}^{(3)} + \tilde{c}_{57}^{(3)}, \quad \tilde{c}_{59}^{(3)} = -6\tilde{c}_{31}^{(3)} - \frac{3}{2}\tilde{c}_{33}^{(3)} + \frac{3}{2}\tilde{c}_{34}^{(3)} + \frac{1}{2}\tilde{c}_{57}^{(3)}, \quad \tilde{c}_{60}^{(3)} = -\frac{3}{2}\tilde{c}_{29}^{(3)} + \frac{3}{2}\tilde{c}_{31}^{(3)},$$

$$\tilde{c}_{61}^{(3)} = -\frac{3}{2}\tilde{c}_{30}^{(3)} - 3\tilde{c}_{31}^{(3)}, \quad \tilde{c}_{63}^{(3)} = 6\tilde{c}_{31}^{(3)} - \tilde{c}_{57}^{(3)}, \quad \tilde{c}_{64}^{(3)} = 12\tilde{c}_{31}^{(3)} - 6\tilde{c}_{34}^{(3)} - 2\tilde{c}_{57}^{(3)},$$

$$\tilde{c}_{67}^{(3)} = -3\tilde{c}_{36}^{(3)} - 3\tilde{c}_{37}^{(3)} - \tilde{c}_{65}^{(3)} + \tilde{c}_{66}^{(3)}, \quad \tilde{c}_{69}^{(3)} = -3\tilde{c}_{37}^{(3)} + 3\tilde{c}_{40}^{(3)} + \tilde{c}_{66}^{(3)},$$

$$\tilde{c}_{70}^{(3)} = -\tilde{c}_{35}^{(3)} + \tilde{c}_{36}^{(3)} + 2\tilde{c}_{37}^{(3)} - \tilde{c}_{38}^{(3)} - \tilde{c}_{40}^{(3)} + \frac{2}{3}\tilde{c}_{65}^{(3)} - \frac{2}{3}\tilde{c}_{66}^{(3)} - \tilde{c}_{68}^{(3)}, \quad \tilde{c}_{71}^{(3)} = \tilde{c}_{37}^{(3)} - \tilde{c}_{39}^{(3)} - \tilde{c}_{40}^{(3)} - \frac{1}{3}\tilde{c}_{66}^{(3)},$$

$$\tilde{c}_{73}^{(3)} = -3\tilde{c}_{45}^{(3)} + 6\tilde{c}_{46}^{(3)} - 6\tilde{c}_{48}^{(3)} + 2\tilde{c}_{72}^{(3)}, \quad \tilde{c}_{74}^{(3)} = -3\tilde{c}_{45}^{(3)} + \tilde{c}_{72}^{(3)}, \quad \tilde{c}_{75}^{(3)} = -\frac{3}{2}\tilde{c}_{44}^{(3)} - \frac{3}{2}\tilde{c}_{45}^{(3)},$$

$$\tilde{c}_{77}^{(3)} = -6\tilde{c}_{47}^{(3)} + 2\tilde{c}_{76}^{(3)}, \quad \tilde{c}_{79}^{(3)} = 6\tilde{c}_{48}^{(3)} + 2\tilde{c}_{78}^{(3)}, \quad \tilde{c}_{85}^{(3)} = \tilde{c}_{35}^{(3)} - \tilde{c}_{36}^{(3)} - \tilde{c}_{37}^{(3)} - \tilde{c}_{54}^{(3)} - \frac{2}{3}\tilde{c}_{65}^{(3)} + \frac{1}{3}\tilde{c}_{66}^{(3)} + \tilde{c}_{68}^{(3)},$$

$$\tilde{c}_{134}^{(3)} = \sqrt{3}\tilde{c}_{90}^{(3)} - \sqrt{3}\tilde{c}_{93}^{(3)} - \sqrt{3}\tilde{c}_{113}^{(3)} - \sqrt{3}\tilde{c}_{115}^{(3)}, \quad \tilde{c}_{135}^{(3)} = \sqrt{3}\tilde{c}_{91}^{(3)} - \sqrt{3}\tilde{c}_{93}^{(3)} + \sqrt{3}\tilde{c}_{113}^{(3)} + \sqrt{3}\tilde{c}_{115}^{(3)},$$

$$\tilde{c}_{141}^{(3)} = -2\sqrt{3}\tilde{c}_{97}^{(3)} + \frac{\sqrt{3}}{2}\tilde{c}_{106}^{(3)}, \quad \tilde{c}_{142}^{(3)} = \sqrt{3}\tilde{c}_{96}^{(3)} - \frac{\sqrt{3}}{2}\tilde{c}_{106}^{(3)}, \quad \tilde{c}_{145}^{(3)} = \sqrt{3}\tilde{c}_{100}^{(3)} - \frac{\sqrt{3}}{2}\tilde{c}_{106}^{(3)},$$

$$\tilde{c}_{151}^{(3)} = \sqrt{3}\tilde{c}_{108}^{(3)} + \sqrt{3}\tilde{c}_{114}^{(3)}, \quad \tilde{c}_{152}^{(3)} = -\sqrt{3}\tilde{c}_{109}^{(3)} - \sqrt{3}\tilde{c}_{113}^{(3)} - 2\sqrt{3}\tilde{c}_{115}^{(3)}, \quad \tilde{c}_{157}^{(3)} = \sqrt{3}\tilde{c}_{112}^{(3)} + \sqrt{3}\tilde{c}_{114}^{(3)},$$

$$\tilde{c}_{166}^{(3)} = -\sqrt{3}\tilde{c}_{29}^{(3)} - 3\sqrt{3}\tilde{c}_{31}^{(3)} + \sqrt{3}\tilde{c}_{34}^{(3)} + \frac{\sqrt{3}}{2}\tilde{c}_{57}^{(3)}, \quad \tilde{c}_{167}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{c}_{30}^{(3)} - 3\sqrt{3}\tilde{c}_{31}^{(3)} + \sqrt{3}\tilde{c}_{34}^{(3)} + \frac{\sqrt{3}}{2}\tilde{c}_{57}^{(3)},$$

$$\tilde{c}_{168}^{(3)} = 2\sqrt{3}\tilde{c}_{31}^{(3)} - \sqrt{3}\tilde{c}_{34}^{(3)} + \sqrt{3}\tilde{c}_{45}^{(3)} - 2\sqrt{3}\tilde{c}_{46}^{(3)} - \frac{\sqrt{3}}{2}\tilde{c}_{57}^{(3)} - \sqrt{3}\tilde{c}_{72}^{(3)} - \sqrt{3}\tilde{c}_{78}^{(3)},$$

$$\tilde{c}_{169}^{(3)} = 4\sqrt{3}\tilde{c}_{31}^{(3)} - \sqrt{3}\tilde{c}_{34}^{(3)} - \sqrt{3}\tilde{c}_{45}^{(3)} + 2\sqrt{3}\tilde{c}_{46}^{(3)} - \frac{\sqrt{3}}{2}\tilde{c}_{57}^{(3)} + \sqrt{3}\tilde{c}_{72}^{(3)} + \sqrt{3}\tilde{c}_{78}^{(3)},$$

$$\tilde{c}_{171}^{(3)} = 6\sqrt{3}\tilde{c}_{31}^{(3)} - 2\sqrt{3}\tilde{c}_{34}^{(3)} - \sqrt{3}\tilde{c}_{57}^{(3)}, \quad \tilde{c}_{172}^{(3)} = -6\sqrt{3}\tilde{c}_{31}^{(3)} + 2\sqrt{3}\tilde{c}_{34}^{(3)} + \sqrt{3}\tilde{c}_{57}^{(3)},$$

$$\tilde{c}_{173}^{(3)} = -6\sqrt{3}\tilde{c}_{31}^{(3)} + 2\sqrt{3}\tilde{c}_{34}^{(3)} + \sqrt{3}\tilde{c}_{57}^{(3)},$$

$$\tilde{c}_{174}^{(3)} = -\sqrt{3}\tilde{c}_{35}^{(3)} + \sqrt{3}\tilde{c}_{36}^{(3)} + 2\sqrt{3}\tilde{c}_{37}^{(3)} - \sqrt{3}\tilde{c}_{40}^{(3)} + \frac{\sqrt{3}}{4}\tilde{c}_{49}^{(3)} + \sqrt{3}\tilde{c}_{65}^{(3)} - \frac{2\sqrt{3}}{3}\tilde{c}_{66}^{(3)} - \sqrt{3}\tilde{c}_{68}^{(3)} + \frac{\sqrt{3}}{4}\tilde{c}_{80}^{(3)},$$

$$\tilde{c}_{175}^{(3)} = \frac{\sqrt{3}}{2}\tilde{c}_{35}^{(3)} + \frac{\sqrt{3}}{2}\tilde{c}_{37}^{(3)} - \frac{\sqrt{3}}{8}\tilde{c}_{49}^{(3)} - \frac{\sqrt{3}}{6}\tilde{c}_{65}^{(3)} + \frac{\sqrt{3}}{6}\tilde{c}_{66}^{(3)} + \frac{\sqrt{3}}{2}\tilde{c}_{68}^{(3)} - \frac{\sqrt{3}}{8}\tilde{c}_{80}^{(3)},$$

$$\tilde{c}_{176}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{c}_{35}^{(3)} - \sqrt{3}\tilde{c}_{36}^{(3)} - \frac{\sqrt{3}}{2}\tilde{c}_{37}^{(3)} + \frac{\sqrt{3}}{8}\tilde{c}_{49}^{(3)} - \frac{\sqrt{3}}{6}\tilde{c}_{65}^{(3)} + \frac{\sqrt{3}}{6}\tilde{c}_{66}^{(3)} - \frac{\sqrt{3}}{2}\tilde{c}_{68}^{(3)} + \frac{\sqrt{3}}{8}\tilde{c}_{80}^{(3)},$$

$$\tilde{c}_{177}^{(3)} = -\sqrt{3}\tilde{c}_{37}^{(3)} + 2\sqrt{3}\tilde{c}_{40}^{(3)} + \frac{\sqrt{3}}{3}\tilde{c}_{66}^{(3)},$$

$$\tilde{c}_{178}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{c}_{35}^{(3)} + \sqrt{3}\tilde{c}_{36}^{(3)} + \frac{\sqrt{3}}{2}\tilde{c}_{37}^{(3)} + \frac{\sqrt{3}}{8}\tilde{c}_{49}^{(3)} + \frac{\sqrt{3}}{2}\tilde{c}_{65}^{(3)} - \frac{\sqrt{3}}{6}\tilde{c}_{66}^{(3)} - \frac{\sqrt{3}}{2}\tilde{c}_{68}^{(3)} + \frac{\sqrt{3}}{8}\tilde{c}_{80}^{(3)},$$

$$\tilde{c}_{179}^{(3)} = \frac{\sqrt{3}}{2}\tilde{c}_{35}^{(3)} - \sqrt{3}\tilde{c}_{36}^{(3)} - \frac{3\sqrt{3}}{2}\tilde{c}_{37}^{(3)} - \frac{\sqrt{3}}{8}\tilde{c}_{49}^{(3)} - \frac{\sqrt{3}}{2}\tilde{c}_{65}^{(3)} + \frac{\sqrt{3}}{2}\tilde{c}_{66}^{(3)} + \frac{\sqrt{3}}{2}\tilde{c}_{68}^{(3)} - \frac{\sqrt{3}}{8}\tilde{c}_{80}^{(3)},$$

$$\tilde{c}_{182}^{(3)} = \sqrt{3}\tilde{c}_{35}^{(3)} - \sqrt{3}\tilde{c}_{36}^{(3)} - \sqrt{3}\tilde{c}_{37}^{(3)} + \sqrt{3}\tilde{c}_{40}^{(3)} - \frac{\sqrt{3}}{4}\tilde{c}_{49}^{(3)} - \frac{\sqrt{3}}{3}\tilde{c}_{65}^{(3)} + \frac{\sqrt{3}}{3}\tilde{c}_{66}^{(3)} + \sqrt{3}\tilde{c}_{68}^{(3)} - \frac{\sqrt{3}}{4}\tilde{c}_{80}^{(3)},$$

$$\tilde{c}_{183}^{(3)} = -\sqrt{3}\tilde{c}_{35}^{(3)} + \sqrt{3}\tilde{c}_{36}^{(3)} + 2\sqrt{3}\tilde{c}_{37}^{(3)} + \frac{\sqrt{3}}{4}\tilde{c}_{49}^{(3)} + \frac{2\sqrt{3}}{3}\tilde{c}_{65}^{(3)} - \frac{\sqrt{3}}{3}\tilde{c}_{66}^{(3)} - \sqrt{3}\tilde{c}_{68}^{(3)} + \frac{\sqrt{3}}{4}\tilde{c}_{80}^{(3)},$$

$$\tilde{c}_{185}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{c}_{44}^{(3)} + \frac{3\sqrt{3}}{2}\tilde{c}_{45}^{(3)} - 2\sqrt{3}\tilde{c}_{46}^{(3)} - \sqrt{3}\tilde{c}_{72}^{(3)} - \sqrt{3}\tilde{c}_{78}^{(3)}, \quad \tilde{c}_{186}^{(3)} = 3\sqrt{3}\tilde{c}_{45}^{(3)} - 4\sqrt{3}\tilde{c}_{46}^{(3)} - 2\sqrt{3}\tilde{c}_{72}^{(3)} - 2\sqrt{3}\tilde{c}_{78}^{(3)},$$

$$\tilde{c}_{187}^{(3)} = -\frac{3\sqrt{3}}{2}\tilde{c}_{45}^{(3)} + 2\sqrt{3}\tilde{c}_{46}^{(3)} - 2\sqrt{3}\tilde{c}_{48}^{(3)} + \sqrt{3}\tilde{c}_{72}^{(3)}, \quad \tilde{c}_{188}^{(3)} = -2\sqrt{3}\tilde{c}_{47}^{(3)} + \sqrt{3}\tilde{c}_{76}^{(3)}, \quad \tilde{c}_{189}^{(3)} = 2\sqrt{3}\tilde{c}_{47}^{(3)} - \sqrt{3}\tilde{c}_{76}^{(3)},$$

$$\tilde{c}_{190}^{(3)} = -2\sqrt{3}\tilde{c}_{47}^{(3)} + \sqrt{3}\tilde{c}_{76}^{(3)}, \quad \tilde{c}_{191}^{(3)} = \frac{\sqrt{3}}{2}\tilde{c}_{44}^{(3)} + \frac{3\sqrt{3}}{2}\tilde{c}_{45}^{(3)} - 2\sqrt{3}\tilde{c}_{46}^{(3)} - \sqrt{3}\tilde{c}_{72}^{(3)} - \sqrt{3}\tilde{c}_{78}^{(3)},$$

$$\tilde{c}_{192}^{(3)} = 3\sqrt{3}\tilde{c}_{45}^{(3)} - 4\sqrt{3}\tilde{c}_{46}^{(3)} + 4\sqrt{3}\tilde{c}_{48}^{(3)} - 2\sqrt{3}\tilde{c}_{72}^{(3)}, \quad \tilde{c}_{193}^{(3)} = -2\sqrt{3}\tilde{c}_{48}^{(3)} - \sqrt{3}\tilde{c}_{78}^{(3)},$$

$$\tilde{c}_{194}^{(3)} = 2\sqrt{3}\tilde{c}_{48}^{(3)} + \sqrt{3}\tilde{c}_{78}^{(3)}, \quad \tilde{c}_{195}^{(3)} = 2\sqrt{3}\tilde{c}_{48}^{(3)} + \sqrt{3}\tilde{c}_{78}^{(3)}. \tag{A2}$$

$$\tilde{C}_{43}^{(3)} = -\frac{1}{3}D_{43}^{(3)} + \frac{2}{3}D_{46}^{(3)} + \frac{1}{3}D_{47}^{(3)} + \frac{2}{3}D_{55}^{(3)}, \qquad \tilde{C}_{44}^{(3)} = \frac{2}{3}D_{43}^{(3)} - \frac{2}{3}D_{47}^{(3)} + \frac{2}{3}D_{55}^{(3)},$$

$$\tilde{C}_{45}^{(3)} = -\frac{1}{3}D_{43}^{(3)} - \frac{2}{3}D_{44}^{(3)} + \frac{1}{3}D_{47}^{(3)} - \frac{4}{3}D_{55}^{(3)} - \frac{4}{3}D_{56}^{(3)}, \qquad \tilde{C}_{46}^{(3)} = \frac{2}{3}D_{43}^{(3)} + \frac{4}{3}D_{44}^{(3)} - \frac{2}{3}D_{47}^{(3)} - \frac{4}{3}D_{55}^{(3)} - \frac{4}{3}D_{56}^{(3)},$$

$$\tilde{C}_{47}^{(3)} = -\frac{2}{3}D_{50}^{(3)} - \frac{2}{3}D_{52}^{(3)}, \qquad \tilde{C}_{48}^{(3)} = \frac{2}{3}D_{49}^{(3)} + \frac{1}{3}D_{50}^{(3)} + \frac{1}{3}D_{52}^{(3)}, \qquad \tilde{C}_{49}^{(3)} = \frac{1}{3}D_{50}^{(3)} + \frac{2}{3}D_{51}^{(3)} + \frac{1}{3}D_{52}^{(3)},$$

$$\tilde{C}_{50}^{(3)} = -\frac{2}{3}D_{50}^{(3)} - \frac{4}{3}D_{51}^{(3)} - \frac{2}{3}D_{52}^{(3)}, \qquad \tilde{C}_{51}^{(3)} = \frac{2}{3}D_{53}^{(3)} - \frac{2}{3}D_{55}^{(3)}, \qquad \tilde{C}_{52}^{(3)} = \frac{4}{3}D_{55}^{(3)} + \frac{4}{3}D_{56}^{(3)},$$

$$\tilde{C}_{54}^{(3)} = 2D_{55}^{(3)} + 2D_{56}^{(3)}, \qquad \tilde{C}_{55}^{(3)} = \frac{2}{3}D_{43}^{(3)} - \frac{2}{3}D_{45}^{(3)} + \frac{2}{3}D_{47}^{(3)}, \qquad \tilde{C}_{56}^{(3)} = -\frac{2}{3}D_{48}^{(3)} - \frac{2}{3}D_{50}^{(3)} + \frac{2}{3}D_{52}^{(3)},$$

$$\tilde{C}_{58}^{(3)} = -\frac{1}{3}D_{57}^{(3)} + \frac{1}{3}D_{59}^{(3)} + D_{60}^{(3)}, \qquad \tilde{C}_{59}^{(3)} = \frac{1}{3}D_{57}^{(3)} + \frac{1}{3}D_{59}^{(3)}, \qquad \tilde{C}_{61}^{(3)} = \frac{1}{3}D_{61}^{(3)} + \frac{1}{3}D_{63}^{(3)} + D_{64}^{(3)},$$

$$\tilde{C}_{62}^{(3)} = \frac{1}{3}D_{61}^{(3)} + \frac{1}{3}D_{62}^{(3)} + \frac{1}{3}D_{63}^{(3)} - D_{65}^{(3)}, \qquad \tilde{C}_{63}^{(3)} = -\frac{1}{3}D_{61}^{(3)} + \frac{1}{3}D_{63}^{(3)}, \qquad \tilde{C}_{70}^{(3)} = -\frac{2}{3}D_{72}^{(3)} - \frac{1}{3}D_{74}^{(3)} + \frac{2}{3}D_{75}^{(3)},$$

$$\tilde{C}_{71}^{(3)} = \frac{2}{3}D_{72}^{(3)} + \frac{4}{3}D_{73}^{(3)} + \frac{1}{3}D_{74}^{(3)}, \qquad \tilde{C}_{72}^{(3)} = -\frac{1}{3}D_{72}^{(3)} + \frac{1}{3}D_{74}^{(3)}, \qquad \tilde{C}_{73}^{(3)} = \frac{2}{3}D_{76}^{(3)} + \frac{2}{3}D_{77}^{(3)},$$

$$\tilde{C}_{74}^{(3)} = \frac{2}{3}D_{78}^{(3)} - \frac{2}{3}D_{79}^{(3)}, \qquad \tilde{C}_{76}^{(3)} = \frac{2}{3}D_{80}^{(3)} - D_{81}^{(3)}, \qquad \tilde{C}_{82}^{(3)} = \frac{1}{3}D_{62}^{(3)} - D_{86}^{(3)},$$

$$\tilde{C}_{85}^{(3)} = -2D_{43}^{(3)} - 2D_{44}^{(3)} + 2D_{55}^{(3)} + 2D_{56}^{(3)}, \qquad \tilde{C}_{86}^{(3)} = D_{43}^{(3)} + D_{44}^{(3)} - D_{45}^{(3)} + 2D_{55}^{(3)} + 2D_{56}^{(3)},$$

$$\tilde{C}_{87}^{(3)} = D_{44}^{(3)} + D_{45}^{(3)} - D_{47}^{(3)} + 2D_{55}^{(3)} + 2D_{56}^{(3)}, \qquad \tilde{C}_{88}^{(3)} = -D_{44}^{(3)} - D_{46}^{(3)} + D_{56}^{(3)},$$

$$\tilde{C}_{89}^{(3)} = -2D_{44}^{(3)} + 2D_{47}^{(3)} + 2D_{55}^{(3)} + 2D_{56}^{(3)}, \qquad \tilde{C}_{90}^{(3)} = 2D_{44}^{(3)} + D_{56}^{(3)}, \qquad \tilde{C}_{92}^{(3)} = -D_{48}^{(3)} - D_{50}^{(3)} - D_{51}^{(3)},$$

$$\tilde{C}_{93}^{(3)} = 2D_{50}^{(3)} + 2D_{51}^{(3)}, \qquad \tilde{C}_{94}^{(3)} = D_{48}^{(3)} - D_{51}^{(3)} - D_{52}^{(3)}, \qquad \tilde{C}_{95}^{(3)} = 2D_{51}^{(3)} + 2D_{52}^{(3)}, \qquad \tilde{C}_{97}^{(3)} = -D_{49}^{(3)} + D_{51}^{(3)},$$

$$\tilde{C}_{99}^{(3)} = -D_{53}^{(3)} - D_{56}^{(3)}, \qquad \tilde{C}_{100}^{(3)} = -2D_{54}^{(3)} - 2D_{55}^{(3)} - 2D_{56}^{(3)}, \qquad \tilde{C}_{101}^{(3)} = 2D_{54}^{(3)} - 2D_{55}^{(3)} - 2D_{56}^{(3)},$$

$$\tilde{C}_{104}^{(3)} = -3D_{55}^{(3)} - 3D_{56}^{(3)}, \qquad \tilde{C}_{105}^{(3)} = -D_{57}^{(3)} - D_{62}^{(3)} - D_{63}^{(3)}, \qquad \tilde{C}_{106}^{(3)} = -D_{58}^{(3)} - D_{62}^{(3)} - 2D_{63}^{(3)},$$

$$\tilde{C}_{107}^{(3)} = -D_{59}^{(3)} - D_{63}^{(3)}, \qquad \tilde{C}_{109}^{(3)} = -D_{61}^{(3)} - D_{62}^{(3)} - D_{63}^{(3)}, \qquad \tilde{C}_{112}^{(3)} = -D_{68}^{(3)} + D_{70}^{(3)}, \qquad \tilde{C}_{113}^{(3)} = -D_{69}^{(3)} + 2D_{70}^{(3)},$$

$$\tilde{C}_{114}^{(3)} = 2D_{72}^{(3)} + 2D_{73}^{(3)}, \qquad \tilde{C}_{116}^{(3)} = -2D_{73}^{(3)} - D_{74}^{(3)}, \qquad \tilde{C}_{117}^{(3)} = -2D_{73}^{(3)} - D_{75}^{(3)}, \qquad \tilde{C}_{118}^{(3)} = 2D_{76}^{(3)} + D_{77}^{(3)},$$

$$\tilde{C}_{122}^{(3)} = 2D_{78}^{(3)} - D_{79}^{(3)}, \qquad \tilde{C}_{136}^{(3)} = -\frac{\sqrt{3}}{3}D_{6}^{(3)} - \frac{2\sqrt{3}}{3}D_{16}^{(3)}, \qquad \tilde{C}_{137}^{(3)} = -\frac{\sqrt{3}}{3}D_{5}^{(3)} - \frac{2\sqrt{3}}{3}D_{16}^{(3)},$$

$$\tilde{C}_{138}^{(3)} = -\frac{\sqrt{3}}{3}D_{4}^{(3)} - \frac{2\sqrt{3}}{3}D_{16}^{(3)}, \qquad \tilde{C}_{146}^{(3)} = -\frac{\sqrt{3}}{3}D_{14}^{(3)} + \frac{2\sqrt{3}}{3}D_{16}^{(3)}, \qquad \tilde{C}_{153}^{(3)} = -\frac{2\sqrt{3}}{3}D_{17}^{(3)} - \frac{\sqrt{3}}{3}D_{18}^{(3)},$$

$$\tilde{C}^{(3)}_{159} = -\frac{2\sqrt{3}}{3}D^{(3)}_{20} - \frac{\sqrt{3}}{3}D^{(3)}_{21}, \qquad \tilde{C}^{(3)}_{162} = -\frac{\sqrt{3}}{3}D^{(3)}_{22} - \frac{\sqrt{3}}{3}D^{(3)}_{23},$$

$$\tilde{C}^{(3)}_{165} = \frac{2\sqrt{3}}{3}D^{(3)}_{24} - \frac{\sqrt{3}}{3}D^{(3)}_{25}, \qquad \tilde{C}^{(3)}_{201} = -D^{(3)}_{4} - \frac{1}{2}D^{(3)}_{33}, \qquad \tilde{C}^{(3)}_{202} = -D^{(3)}_{5} + D^{(3)}_{33},$$

$$\tilde{C}^{(3)}_{203} = -D^{(3)}_{6} - \frac{1}{2}D^{(3)}_{33}, \qquad \tilde{C}^{(3)}_{219} = -2D^{(3)}_{17} - D^{(3)}_{18}, \qquad \tilde{C}^{(3)}_{220} = 2D^{(3)}_{17} + D^{(3)}_{22},$$

$$\tilde{C}^{(3)}_{221} = -2D^{(3)}_{17} - D^{(3)}_{18} - D^{(3)}_{22}, \qquad \tilde{C}^{(3)}_{224} = -D^{(3)}_{19} - D^{(3)}_{22},$$

$$\tilde{C}^{(3)}_{226} = -2D^{(3)}_{20} - D^{(3)}_{21}, \qquad \tilde{C}^{(3)}_{228} = 2D^{(3)}_{22} + 2D^{(3)}_{23}, \qquad \tilde{C}^{(3)}_{229} = 2D^{(3)}_{24} - D^{(3)}_{25} - D^{(3)}_{26},$$

$$\tilde{C}^{(3)}_{231} = 2D^{(3)}_{24} - D^{(3)}_{25} + D^{(3)}_{26}, \qquad \tilde{C}^{(3)}_{235} = -D^{(3)}_{29} - D^{(3)}_{33}, \qquad \tilde{C}^{(3)}_{253} = \frac{\sqrt{3}}{3}D^{(3)}_{43} + \frac{\sqrt{3}}{3}D^{(3)}_{45} - \frac{\sqrt{3}}{3}D^{(3)}_{46} - \frac{\sqrt{3}}{3}D^{(3)}_{55},$$

$$\tilde{C}^{(3)}_{254} = -\frac{\sqrt{3}}{3}D^{(3)}_{43} + \frac{\sqrt{3}}{3}D^{(3)}_{47} - \frac{\sqrt{3}}{3}D^{(3)}_{55}, \qquad \tilde{C}^{(3)}_{255} = -\frac{\sqrt{3}}{3}D^{(3)}_{45} - \frac{\sqrt{3}}{3}D^{(3)}_{46} - \frac{\sqrt{3}}{3}D^{(3)}_{47} - \frac{\sqrt{3}}{3}D^{(3)}_{55},$$

$$\tilde{C}^{(3)}_{256} = \frac{\sqrt{3}}{3}D^{(3)}_{43} + \frac{\sqrt{3}}{3}D^{(3)}_{44} + \frac{\sqrt{3}}{3}D^{(3)}_{45} - \frac{\sqrt{3}}{3}D^{(3)}_{55} - \frac{\sqrt{3}}{3}D^{(3)}_{56} - \frac{\sqrt{3}}{3}D^{(3)}_{72} - \frac{\sqrt{3}}{3}D^{(3)}_{73} - \frac{\sqrt{3}}{6}D^{(3)}_{74},$$

$$\tilde{C}^{(3)}_{257} = -\frac{\sqrt{3}}{3}D^{(3)}_{43} - \frac{2\sqrt{3}}{3}D^{(3)}_{44} + \frac{\sqrt{3}}{3}D^{(3)}_{47} - \frac{\sqrt{3}}{3}D^{(3)}_{55} - \frac{\sqrt{3}}{3}D^{(3)}_{56} + \frac{2\sqrt{3}}{3}D^{(3)}_{72} + \frac{2\sqrt{3}}{3}D^{(3)}_{73} + \frac{\sqrt{3}}{3}D^{(3)}_{74},$$

$$\tilde{C}^{(3)}_{258} = \frac{\sqrt{3}}{3}D^{(3)}_{44} - \frac{\sqrt{3}}{3}D^{(3)}_{45} - \frac{\sqrt{3}}{3}D^{(3)}_{47} - \frac{\sqrt{3}}{3}D^{(3)}_{55} - \frac{\sqrt{3}}{3}D^{(3)}_{56} - \frac{\sqrt{3}}{3}D^{(3)}_{72} - \frac{\sqrt{3}}{3}D^{(3)}_{73} - \frac{\sqrt{3}}{6}D^{(3)}_{74},$$

$$\tilde{C}^{(3)}_{260} = \frac{\sqrt{3}}{3}D^{(3)}_{43} + \frac{2\sqrt{3}}{3}D^{(3)}_{45} + \frac{\sqrt{3}}{3}D^{(3)}_{47}, \qquad \tilde{C}^{(3)}_{261} = \frac{\sqrt{3}}{3}D^{(3)}_{50} + \frac{\sqrt{3}}{3}D^{(3)}_{52},$$

$$\tilde{C}^{(3)}_{262} = -\frac{\sqrt{3}}{3}D^{(3)}_{48} - \frac{\sqrt{3}}{3}D^{(3)}_{49} - \frac{\sqrt{3}}{3}D^{(3)}_{52}, \qquad \tilde{C}^{(3)}_{263} = \frac{\sqrt{3}}{3}D^{(3)}_{48} - \frac{\sqrt{3}}{3}D^{(3)}_{49} - \frac{\sqrt{3}}{3}D^{(3)}_{50},$$

$$\tilde{C}^{(3)}_{264} = \frac{\sqrt{3}}{3}D^{(3)}_{50} + \frac{2\sqrt{3}}{3}D^{(3)}_{51} + \frac{\sqrt{3}}{3}D^{(3)}_{52}, \qquad \tilde{C}^{(3)}_{265} = \frac{\sqrt{3}}{3}D^{(3)}_{48} - \frac{\sqrt{3}}{3}D^{(3)}_{50} - \frac{\sqrt{3}}{3}D^{(3)}_{51},$$

$$\tilde{C}^{(3)}_{266} = -\frac{\sqrt{3}}{3}D^{(3)}_{48} - \frac{\sqrt{3}}{3}D^{(3)}_{51} - \frac{\sqrt{3}}{3}D^{(3)}_{52}, \qquad \tilde{C}^{(3)}_{267} = \frac{2\sqrt{3}}{3}D^{(3)}_{48} - \frac{\sqrt{3}}{3}D^{(3)}_{50} + \frac{\sqrt{3}}{3}D^{(3)}_{52},$$

$$\tilde{C}^{(3)}_{269} = -\frac{\sqrt{3}}{3}D^{(3)}_{53} + \frac{\sqrt{3}}{3}D^{(3)}_{55}, \qquad \tilde{C}^{(3)}_{270} = \frac{\sqrt{3}}{3}D^{(3)}_{55} + \frac{\sqrt{3}}{3}D^{(3)}_{56}, \qquad \tilde{C}^{(3)}_{272} = \frac{\sqrt{3}}{2}D^{(3)}_{55} + \frac{\sqrt{3}}{2}D^{(3)}_{56},$$

$$\tilde{C}^{(3)}_{274} = -\frac{\sqrt{3}}{3}D^{(3)}_{57} + \frac{\sqrt{3}}{3}D^{(3)}_{61} - \frac{\sqrt{3}}{3}D^{(3)}_{62} + \frac{\sqrt{3}}{6}D^{(3)}_{80}, \qquad \tilde{C}^{(3)}_{275} = -\frac{\sqrt{3}}{3}D^{(3)}_{58} + \frac{\sqrt{3}}{6}D^{(3)}_{59} - \frac{\sqrt{3}}{6}D^{(3)}_{63} - \frac{\sqrt{3}}{12}D^{(3)}_{80},$$

$$\tilde{C}^{(3)}_{276} = -\frac{\sqrt{3}}{2}D^{(3)}_{59} - \frac{\sqrt{3}}{6}D^{(3)}_{63} + \frac{\sqrt{3}}{12}D^{(3)}_{80}, \qquad \tilde{C}^{(3)}_{277} = -\frac{2\sqrt{3}}{3}D^{(3)}_{61} - \frac{\sqrt{3}}{3}D^{(3)}_{62},$$

$$\tilde{C}^{(3)}_{278} = \frac{\sqrt{3}}{6}D^{(3)}_{59} - \frac{\sqrt{3}}{3}D^{(3)}_{62} - \frac{\sqrt{3}}{6}D^{(3)}_{63} + \frac{\sqrt{3}}{12}D^{(3)}_{80}, \qquad \tilde{C}^{(3)}_{279} = -\frac{\sqrt{3}}{6}D^{(3)}_{59} - \frac{\sqrt{3}}{2}D^{(3)}_{63} - \frac{\sqrt{3}}{12}D^{(3)}_{80},$$

$$\tilde{C}^{(3)}_{282} = -\frac{\sqrt{3}}{3}D^{(3)}_{57} - \frac{\sqrt{3}}{3}D^{(3)}_{61} - \frac{\sqrt{3}}{6}D^{(3)}_{80}, \qquad \tilde{C}^{(3)}_{283} = -\frac{\sqrt{3}}{3}D^{(3)}_{58} - \frac{\sqrt{3}}{3}D^{(3)}_{62} + \frac{\sqrt{3}}{6}D^{(3)}_{80},$$

$$\tilde{C}^{(3)}_{284} = -\frac{\sqrt{3}}{3}D^{(3)}_{68} + \frac{\sqrt{3}}{3}D^{(3)}_{70}, \qquad \tilde{C}^{(3)}_{286} = -\frac{\sqrt{3}}{3}D^{(3)}_{68} - \frac{\sqrt{3}}{3}D^{(3)}_{70}, \qquad \tilde{C}^{(3)}_{290} = -\frac{2\sqrt{3}}{3}D^{(3)}_{72} - \frac{\sqrt{3}}{3}D^{(3)}_{74},$$

$$\tilde{C}_{291}^{(3)} = \frac{\sqrt{3}}{3}D_{72}^{(3)} + \frac{\sqrt{3}}{6}D_{74}^{(3)}, \qquad \tilde{C}_{292}^{(3)} = \frac{2\sqrt{3}}{3}D_{76}^{(3)} - \frac{\sqrt{3}}{3}D_{77}^{(3)}, \qquad \tilde{C}_{293}^{(3)} = -\frac{2\sqrt{3}}{3}D_{76}^{(3)} + \frac{\sqrt{3}}{3}D_{77}^{(3)},$$

$$\tilde{C}_{294}^{(3)} = \frac{2\sqrt{3}}{3}D_{76}^{(3)} - \frac{\sqrt{3}}{3}D_{77}^{(3)}, \qquad \tilde{C}_{295}^{(3)} = -\frac{2\sqrt{3}}{3}D_{72}^{(3)} - \frac{\sqrt{3}}{3}D_{74}^{(3)} + \frac{\sqrt{3}}{3}D_{75}^{(3)},$$

$$\tilde{C}_{296}^{(3)} = -\frac{2\sqrt{3}}{3}D_{72}^{(3)} - \frac{\sqrt{3}}{3}D_{74}^{(3)}, \qquad \tilde{C}_{297}^{(3)} = \frac{2\sqrt{3}}{3}D_{78}^{(3)} + \frac{\sqrt{3}}{3}D_{79}^{(3)}, \qquad \tilde{C}_{298}^{(3)} = -\frac{2\sqrt{3}}{3}D_{78}^{(3)} - \frac{\sqrt{3}}{3}D_{79}^{(3)},$$

$$\tilde{C}_{302}^{(3)} = \frac{2\sqrt{3}}{3}D_{78}^{(3)} + \frac{\sqrt{3}}{3}D_{79}^{(3)}. \tag{A3}$$

$$\tilde{C}_{52}^{(3)} = -\frac{2}{3}\tilde{C}_{45}^{(3)} - \frac{1}{3}\tilde{C}_{46}^{(3)}, \qquad \tilde{C}_{54}^{(3)} = -\tilde{C}_{45}^{(3)} - \frac{1}{2}\tilde{C}_{46}^{(3)}, \qquad \tilde{C}_{86}^{(3)} = -\frac{3}{2}\tilde{C}_{45}^{(3)} + \frac{3}{4}\tilde{C}_{46}^{(3)} + \frac{3}{2}\tilde{C}_{55}^{(3)} + \frac{1}{2}\tilde{C}_{85}^{(3)},$$

$$\tilde{C}_{87}^{(3)} = -\frac{3}{2}\tilde{C}_{45}^{(3)} - \frac{3}{4}\tilde{C}_{46}^{(3)} - \frac{3}{2}\tilde{C}_{55}^{(3)} - \frac{1}{2}\tilde{C}_{85}^{(3)}, \qquad \tilde{C}_{88}^{(3)} = -\frac{3}{2}\tilde{C}_{43}^{(3)} - \frac{3}{4}\tilde{C}_{46}^{(3)}, \qquad \tilde{C}_{89}^{(3)} = -3\tilde{C}_{46}^{(3)} - \tilde{C}_{85}^{(3)},$$

$$\tilde{C}_{90}^{(3)} = -\frac{3}{2}\tilde{C}_{44}^{(3)} - \frac{3}{2}\tilde{C}_{45}^{(3)} + \frac{3}{4}\tilde{C}_{46}^{(3)}, \qquad \tilde{C}_{93}^{(3)} = 6\tilde{C}_{49}^{(3)} - 3\tilde{C}_{56}^{(3)} + 2\tilde{C}_{92}^{(3)}, \qquad \tilde{C}_{94}^{(3)} = -3\tilde{C}_{49}^{(3)} - \tilde{C}_{92}^{(3)},$$

$$\tilde{C}_{95}^{(3)} = 3\tilde{C}_{56}^{(3)} - 2\tilde{C}_{92}^{(3)}, \qquad \tilde{C}_{96}^{(3)} = -\frac{3}{2}\tilde{C}_{47}^{(3)} - 3\tilde{C}_{49}^{(3)}, \qquad \tilde{C}_{97}^{(3)} = -\frac{3}{2}\tilde{C}_{48}^{(3)} + \frac{3}{2}\tilde{C}_{49}^{(3)},$$

$$\tilde{C}_{99}^{(3)} = \frac{1}{2}\tilde{C}_{45}^{(3)} + \frac{1}{4}\tilde{C}_{46}^{(3)} - \frac{3}{2}\tilde{C}_{51}^{(3)}, \qquad \tilde{C}_{100}^{(3)} = \tilde{C}_{45}^{(3)} + \frac{1}{2}\tilde{C}_{46}^{(3)} + 3\tilde{C}_{57}^{(3)}, \qquad \tilde{C}_{101}^{(3)} = \tilde{C}_{45}^{(3)} + \frac{1}{2}\tilde{C}_{46}^{(3)} - 3\tilde{C}_{57}^{(3)},$$

$$\tilde{C}_{103}^{(3)} = \frac{3}{4}\tilde{C}_{45}^{(3)} + \frac{3}{8}\tilde{C}_{46}^{(3)} - \frac{3}{2}\tilde{C}_{53}^{(3)}, \qquad \tilde{C}_{104}^{(3)} = \frac{3}{2}\tilde{C}_{45}^{(3)} + \frac{3}{4}\tilde{C}_{46}^{(3)}, \qquad \tilde{C}_{107}^{(3)} = -3\tilde{C}_{59}^{(3)} - 3\tilde{C}_{60}^{(3)} - \tilde{C}_{105}^{(3)} + \tilde{C}_{106}^{(3)},$$

$$\tilde{C}_{109}^{(3)} = -3\tilde{C}_{60}^{(3)} + 3\tilde{C}_{63}^{(3)} + \tilde{C}_{106}^{(3)}, \qquad \tilde{C}_{110}^{(3)} = -\tilde{C}_{58}^{(3)} + \tilde{C}_{59}^{(3)} + 2\tilde{C}_{60}^{(3)} - \tilde{C}_{61}^{(3)} - \tilde{C}_{63}^{(3)} + \frac{2}{3}\tilde{C}_{105}^{(3)} - \frac{2}{3}\tilde{C}_{106}^{(3)} - \tilde{C}_{108}^{(3)},$$

$$\tilde{C}_{111}^{(3)} = \tilde{C}_{60}^{(3)} - \tilde{C}_{62}^{(3)} - \tilde{C}_{63}^{(3)} - \frac{1}{3}\tilde{C}_{106}^{(3)}, \qquad \tilde{C}_{112}^{(3)} = -\frac{3}{2}\tilde{C}_{66}^{(3)} - \frac{3}{2}\tilde{C}_{68}^{(3)}, \qquad \tilde{C}_{113}^{(3)} = 3\tilde{C}_{67}^{(3)} - 3\tilde{C}_{68}^{(3)},$$

$$\tilde{C}_{115}^{(3)} = -3\tilde{C}_{71}^{(3)} + 6\tilde{C}_{72}^{(3)} + 2\tilde{C}_{114}^{(3)}, \qquad \tilde{C}_{116}^{(3)} = -3\tilde{C}_{71}^{(3)} + \tilde{C}_{114}^{(3)}, \qquad \tilde{C}_{117}^{(3)} = -\frac{3}{2}\tilde{C}_{70}^{(3)} - \frac{3}{2}\tilde{C}_{71}^{(3)},$$

$$\tilde{C}_{119}^{(3)} = -6\tilde{C}_{73}^{(3)} + 2\tilde{C}_{118}^{(3)}, \qquad \tilde{C}_{123}^{(3)} = -6\tilde{C}_{74}^{(3)} + 2\tilde{C}_{122}^{(3)},$$

$$\tilde{C}_{130}^{(3)} = \tilde{C}_{58}^{(3)} - \tilde{C}_{59}^{(3)} - \tilde{C}_{60}^{(3)} - \tilde{C}_{82}^{(3)} - \frac{2}{3}\tilde{C}_{105}^{(3)} + \frac{1}{3}\tilde{C}_{106}^{(3)} + \tilde{C}_{108}^{(3)}, \qquad \tilde{C}_{201}^{(3)} = \sqrt{3}\tilde{C}_{138}^{(3)} + \sqrt{3}\tilde{C}_{148}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{174}^{(3)},$$

$$\tilde{C}_{202}^{(3)} = \sqrt{3}\tilde{C}_{137}^{(3)} + \sqrt{3}\tilde{C}_{148}^{(3)} + \sqrt{3}\tilde{C}_{174}^{(3)}, \qquad \tilde{C}_{203}^{(3)} = \sqrt{3}\tilde{C}_{136}^{(3)} + \sqrt{3}\tilde{C}_{148}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{174}^{(3)}, \qquad \tilde{C}_{215}^{(3)} = \sqrt{3}\tilde{C}_{146}^{(3)} - \sqrt{3}\tilde{C}_{148}^{(3)},$$

$$\tilde{C}_{220}^{(3)} = -2\sqrt{3}\tilde{C}_{154}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{163}^{(3)}, \qquad \tilde{C}_{221}^{(3)} = \sqrt{3}\tilde{C}_{153}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{163}^{(3)}, \qquad \tilde{C}_{224}^{(3)} = \sqrt{3}\tilde{C}_{157}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{163}^{(3)},$$

$$\tilde{C}_{229}^{(3)} = \sqrt{3}\tilde{C}_{165}^{(3)} + \sqrt{3}\tilde{C}_{167}^{(3)}, \qquad \tilde{C}_{231}^{(3)} = \sqrt{3}\tilde{C}_{165}^{(3)} - \sqrt{3}\tilde{C}_{167}^{(3)}, \qquad \tilde{C}_{235}^{(3)} = -\sqrt{3}\tilde{C}_{170}^{(3)} - \sqrt{3}\tilde{C}_{174}^{(3)},$$

$$\tilde{C}_{253}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{C}_{43}^{(3)} - \frac{3\sqrt{3}}{4}\tilde{C}_{46}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{55}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{85}^{(3)}, \qquad \tilde{C}_{255}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{C}_{43}^{(3)} + \frac{3\sqrt{3}}{4}\tilde{C}_{46}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{55}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{85}^{(3)},$$

$$\tilde{C}_{256}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{C}_{46}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{55}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{71}^{(3)} - \sqrt{3}\tilde{C}_{72}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{85}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{114}^{(3)},$$

$$\tilde{C}_{257}^{(3)} = \frac{\sqrt{3}}{2}\tilde{C}_{45}^{(3)} - \frac{\sqrt{3}}{4}\tilde{C}_{46}^{(3)} - \sqrt{3}\tilde{C}_{71}^{(3)} + 2\sqrt{3}\tilde{C}_{72}^{(3)} + \sqrt{3}\tilde{C}_{114}^{(3)},$$

$$\tilde{C}_{258}^{(3)} = \sqrt{3}\tilde{C}_{46}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{55}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{71}^{(3)} - \sqrt{3}\tilde{C}_{72}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{85}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{114}^{(3)},$$

$$\tilde{C}_{260}^{(3)} = -\frac{3\sqrt{3}}{2}\tilde{C}_{46}^{(3)} - \sqrt{3}\tilde{C}_{55}^{(3)} - \sqrt{3}\tilde{C}_{85}^{(3)},$$

$$\tilde{C}_{262}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{C}_{48}^{(3)} + \frac{3\sqrt{3}}{2}\tilde{C}_{49}^{(3)} - \sqrt{3}\tilde{C}_{56}^{(3)} + \sqrt{3}\tilde{C}_{92}^{(3)}, \quad \tilde{C}_{263}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{C}_{48}^{(3)} - \frac{3\sqrt{3}}{2}\tilde{C}_{49}^{(3)} + \sqrt{3}\tilde{C}_{56}^{(3)} - \sqrt{3}\tilde{C}_{92}^{(3)},$$

$$\tilde{C}_{265}^{(3)} = -2\sqrt{3}\tilde{C}_{49}^{(3)} + \sqrt{3}\tilde{C}_{56}^{(3)} - \sqrt{3}\tilde{C}_{92}^{(3)}, \quad \tilde{C}_{266}^{(3)} = \sqrt{3}\tilde{C}_{49}^{(3)} - \sqrt{3}\tilde{C}_{56}^{(3)} + \sqrt{3}\tilde{C}_{92}^{(3)},$$

$$\tilde{C}_{267}^{(3)} = -3\sqrt{3}\tilde{C}_{49}^{(3)} + 2\sqrt{3}\tilde{C}_{56}^{(3)} - 2\sqrt{3}\tilde{C}_{92}^{(3)}, \quad \tilde{C}_{270}^{(3)} = -\frac{\sqrt{3}}{6}\tilde{C}_{45}^{(3)} - \frac{\sqrt{3}}{12}\tilde{C}_{46}^{(3)}, \quad \tilde{C}_{272}^{(3)} = -\frac{\sqrt{3}}{4}\tilde{C}_{45}^{(3)} - \frac{\sqrt{3}}{8}\tilde{C}_{46}^{(3)},$$

$$\tilde{C}_{274}^{(3)} = -\sqrt{3}\tilde{C}_{58}^{(3)} + \sqrt{3}\tilde{C}_{59}^{(3)} + 2\sqrt{3}\tilde{C}_{60}^{(3)} - \sqrt{3}\tilde{C}_{63}^{(3)} + \frac{\sqrt{3}}{4}\tilde{C}_{76}^{(3)} + \sqrt{3}\tilde{C}_{105}^{(3)} - \frac{2\sqrt{3}}{3}\tilde{C}_{106}^{(3)} - \sqrt{3}\tilde{C}_{108}^{(3)} + \frac{\sqrt{3}}{4}\tilde{C}_{124}^{(3)},$$

$$\tilde{C}_{275}^{(3)} = \frac{\sqrt{3}}{2}\tilde{C}_{58}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{60}^{(3)} - \frac{\sqrt{3}}{8}\tilde{C}_{76}^{(3)} - \frac{\sqrt{3}}{6}\tilde{C}_{105}^{(3)} + \frac{\sqrt{3}}{6}\tilde{C}_{106}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{108}^{(3)} - \frac{\sqrt{3}}{8}\tilde{C}_{124}^{(3)},$$

$$\tilde{C}_{276}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{C}_{58}^{(3)} - \sqrt{3}\tilde{C}_{59}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{60}^{(3)} + \frac{\sqrt{3}}{8}\tilde{C}_{76}^{(3)} - \frac{\sqrt{3}}{6}\tilde{C}_{105}^{(3)} + \frac{\sqrt{3}}{6}\tilde{C}_{106}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{108}^{(3)} + \frac{\sqrt{3}}{8}\tilde{C}_{124}^{(3)},$$

$$\tilde{C}_{277}^{(3)} = -\sqrt{3}\tilde{C}_{60}^{(3)} + 2\sqrt{3}\tilde{C}_{63}^{(3)} + \frac{\sqrt{3}}{3}\tilde{C}_{106}^{(3)},$$

$$\tilde{C}_{278}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{C}_{58}^{(3)} + \sqrt{3}\tilde{C}_{59}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{60}^{(3)} + \frac{\sqrt{3}}{8}\tilde{C}_{76}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{105}^{(3)} - \frac{\sqrt{3}}{6}\tilde{C}_{106}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{108}^{(3)} + \frac{\sqrt{3}}{8}\tilde{C}_{124}^{(3)},$$

$$\tilde{C}_{279}^{(3)} = \frac{\sqrt{3}}{2}\tilde{C}_{58}^{(3)} - \sqrt{3}\tilde{C}_{59}^{(3)} - \frac{3\sqrt{3}}{2}\tilde{C}_{60}^{(3)} - \frac{\sqrt{3}}{8}\tilde{C}_{76}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{105}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{106}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{108}^{(3)} - \frac{\sqrt{3}}{8}\tilde{C}_{124}^{(3)},$$

$$\tilde{C}_{282}^{(3)} = \sqrt{3}\tilde{C}_{58}^{(3)} - \sqrt{3}\tilde{C}_{59}^{(3)} - \sqrt{3}\tilde{C}_{60}^{(3)} + \sqrt{3}\tilde{C}_{63}^{(3)} - \frac{\sqrt{3}}{4}\tilde{C}_{76}^{(3)} - \frac{\sqrt{3}}{3}\tilde{C}_{105}^{(3)} + \frac{\sqrt{3}}{3}\tilde{C}_{106}^{(3)} + \sqrt{3}\tilde{C}_{108}^{(3)} - \frac{\sqrt{3}}{4}\tilde{C}_{124}^{(3)},$$

$$\tilde{C}_{283}^{(3)} = -\sqrt{3}\tilde{C}_{58}^{(3)} + \sqrt{3}\tilde{C}_{59}^{(3)} + 2\sqrt{3}\tilde{C}_{60}^{(3)} + \frac{\sqrt{3}}{4}\tilde{C}_{76}^{(3)} + \frac{2\sqrt{3}}{3}\tilde{C}_{105}^{(3)} - \frac{\sqrt{3}}{3}\tilde{C}_{106}^{(3)} - \sqrt{3}\tilde{C}_{108}^{(3)} + \frac{\sqrt{3}}{4}\tilde{C}_{124}^{(3)},$$

$$\tilde{C}_{284}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{C}_{66}^{(3)} - \frac{\sqrt{3}}{2}\tilde{C}_{68}^{(3)}, \quad \tilde{C}_{286}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{C}_{66}^{(3)} + \frac{\sqrt{3}}{2}\tilde{C}_{68}^{(3)},$$

$$\tilde{C}_{289}^{(3)} = -\frac{\sqrt{3}}{2}\tilde{C}_{70}^{(3)} + \frac{3\sqrt{3}}{2}\tilde{C}_{71}^{(3)} - 2\sqrt{3}\tilde{C}_{72}^{(3)} - \sqrt{3}\tilde{C}_{114}^{(3)}, \quad \tilde{C}_{290}^{(3)} = 3\sqrt{3}\tilde{C}_{71}^{(3)} - 4\sqrt{3}\tilde{C}_{72}^{(3)} - 2\sqrt{3}\tilde{C}_{114}^{(3)},$$

$$\tilde{C}_{291}^{(3)} = -\frac{3\sqrt{3}}{2}\tilde{C}_{71}^{(3)} + 2\sqrt{3}\tilde{C}_{72}^{(3)} + \sqrt{3}\tilde{C}_{114}^{(3)}, \quad \tilde{C}_{292}^{(3)} = -2\sqrt{3}\tilde{C}_{73}^{(3)} + \sqrt{3}\tilde{C}_{118}^{(3)}, \quad \tilde{C}_{293}^{(3)} = 2\sqrt{3}\tilde{C}_{73}^{(3)} - \sqrt{3}\tilde{C}_{118}^{(3)},$$

$$\tilde{C}_{294}^{(3)} = -2\sqrt{3}\tilde{C}_{73}^{(3)} + \sqrt{3}\tilde{C}_{118}^{(3)}, \quad \tilde{C}_{295}^{(3)} = \frac{\sqrt{3}}{2}\tilde{C}_{70}^{(3)} + \frac{3\sqrt{3}}{2}\tilde{C}_{71}^{(3)} - 2\sqrt{3}\tilde{C}_{72}^{(3)} - \sqrt{3}\tilde{C}_{114}^{(3)},$$

$$\tilde{C}_{296}^{(3)} = 3\sqrt{3}\tilde{C}_{71}^{(3)} - 4\sqrt{3}\tilde{C}_{72}^{(3)} - 2\sqrt{3}\tilde{C}_{114}^{(3)}, \quad \tilde{C}_{297}^{(3)} = -2\sqrt{3}\tilde{C}_{74}^{(3)} + \sqrt{3}\tilde{C}_{122}^{(3)}, \quad \tilde{C}_{298}^{(3)} = 2\sqrt{3}\tilde{C}_{74}^{(3)} - \sqrt{3}\tilde{C}_{122}^{(3)},$$

$$\tilde{C}_{302}^{(3)} = -2\sqrt{3}\tilde{C}_{74}^{(3)} + \sqrt{3}\tilde{C}_{122}^{(3)} \tag{A4}$$

TABLE VII.   Independent Lagrangian terms in the heavy-quark limit at the $\mathcal{O}(p^3)$ order.

O_n	$SU(2)$	$SU(3)$	O_n	$SU(2)$	$SU(3)$
$\langle\bar B_{\bar3}u^\mu u_\mu u^\nu\psi_\nu\rangle$	1	1	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma u_\sigma v_\lambda\psi_\rho\rangle$ + H.c.	32	46
$\langle\bar B_{\bar3}u^\mu u^\nu u_\mu\psi_\nu\rangle$	2	2	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u^\sigma u_\nu u_\lambda v_\rho\psi_\sigma\rangle$ + H.c.		47
$\langle\bar B_{\bar3}u^\mu u^\nu u_\nu\psi_\mu\rangle$		3	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u_\lambda v_\rho\psi^\sigma u^T_\sigma\rangle$ + H.c.	33	48
$\langle\bar B_{\bar3}u^\mu u^\nu u^\lambda v_\mu v_\nu\psi_\lambda\rangle$	3	4	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma v_\lambda\psi_\rho u^T_\sigma\rangle$ + H.c.		49
$\langle\bar B_{\bar3}u^\mu u^\nu u^\lambda v_\mu v_\lambda\psi_\nu\rangle$	4	5	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma v_\lambda\psi_\sigma u^T_\rho\rangle$ + H.c.	34	50
$\langle\bar B_{\bar3}u^\mu u^\nu u^\lambda v_\nu v_\lambda\psi_\mu\rangle$		6	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma v_\sigma\psi_\lambda u^T_\rho\rangle$ + H.c.		51
$\langle\bar B_{\bar3}u^\mu u_\mu\psi^\nu u^T_\nu\rangle$		7	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u^\sigma u_\nu v_\lambda\psi_\sigma u^T_\rho\rangle$ + H.c.		52
$\langle\bar B_{\bar3}u^\mu u^\nu\psi_\mu u^T_\nu\rangle$	5	8	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu v_\nu\psi_\lambda\rangle\langle u_\rho u^\sigma u_\sigma\rangle$		53
$\langle\bar B_{\bar3}u^\mu u^\nu\psi_\nu u^T_\mu\rangle$		9	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu v_\nu\psi^\sigma\rangle\langle u_\lambda u_\rho u_\sigma\rangle$ + H.c.		54
$\langle\bar B_{\bar3}u^\mu u^\nu v_\mu v_\nu\psi^\lambda u^T_\lambda\rangle$		10	$i\epsilon^{\mu\nu\lambda\rho}\langle u_\mu u^\sigma\rangle\langle\bar\psi_\nu u_\lambda v_\rho\psi_\sigma\rangle$ + H.c.		55
$\langle\bar B_{\bar3}u^\mu u^\nu v_\mu v^\lambda\psi_\nu u^T_\lambda\rangle$	6	11	$i\epsilon^{\mu\nu\lambda\rho}\langle u_\mu u^\sigma\rangle\langle\bar\psi_\nu u_\lambda v_\sigma\psi_\rho\rangle$		56
$\langle\bar B_{\bar3}u^\mu u^\nu v_\nu v^\lambda\psi_\mu u^T_\lambda\rangle$		12	$i\langle\bar\psi^\mu u_\mu f_-{}^{\nu\lambda}v_\nu\psi_\lambda\rangle$ + H.c.	35	57
$\langle\bar B_{\bar3}\psi^\mu\rangle\langle u_\mu u^\nu u_\nu\rangle$		13	$i\langle\bar\psi^\mu u^\nu f_{-\mu}{}^\lambda v_\nu\psi_\lambda\rangle$ + H.c.	36	58
$\langle\bar B_{\bar3}v^\mu v^\nu\psi^\lambda\rangle\langle u_\mu u_\nu u_\lambda\rangle$		14	$i\langle\bar\psi^\mu u^\nu f_{-\mu}{}^\lambda v_\lambda\psi_\nu\rangle$ + H.c.	37	59
$\langle u^\mu u_\mu\rangle\langle\bar B_{\bar3}u^\nu\psi_\nu\rangle$		15	$i\langle\bar\psi^\mu u^\nu f_{-\nu}{}^\lambda v_\lambda\psi_\mu\rangle$ + H.c.	38	60
$\langle u^\mu u^\nu\rangle\langle\bar B_{\bar3}u^\lambda v_\mu v_\nu\psi_\lambda\rangle$		16	$i\langle\bar\psi^\mu u_\mu h^{\nu\lambda}v_\nu\psi_\lambda\rangle$ + H.c.	39	61
$\epsilon^{\mu\nu\lambda\rho}\langle\bar B_{\bar3}u_\mu f_{-\nu\lambda}\psi_\rho\rangle$	7	17	$i\langle\bar\psi^\mu u^\nu h_\mu{}^\lambda v_\nu\psi_\lambda\rangle$ + H.c.	40	62
$\epsilon^{\mu\nu\lambda\rho}\langle\bar B_{\bar3}u_\mu f_{-\nu}{}^\sigma v_\lambda v_\sigma\psi_\rho\rangle$	8	18	$i\langle\bar\psi^\mu u^\nu h_\mu{}^\lambda v_\lambda\psi_\nu\rangle$ + H.c.	41	63
$\epsilon^{\mu\nu\lambda\rho}\langle\bar B_{\bar3}u_\mu h_\nu{}^\sigma v_\lambda v_\sigma\psi_\rho\rangle$	9	19	$i\langle\bar\psi^\mu u^\nu h_\nu{}^\lambda v_\lambda\psi_\mu\rangle$ + H.c.	42	64
$\epsilon^{\mu\nu\lambda\rho}\langle\bar B_{\bar3}u_\mu\psi_\nu f^T_{-\lambda\rho}\rangle$	10	20	$i\langle\bar\psi^\mu u^\nu h^{\lambda\rho}v_\nu v_\lambda\psi_\rho v_\mu\rangle$ + H.c.	43	65
$\epsilon^{\mu\nu\lambda\rho}\langle\bar B_{\bar3}u_\mu v_\nu v^\sigma\psi_\lambda f^T_{-\rho\sigma}\rangle$	11	21	$i\langle\bar\psi^\mu u_\mu v^\nu\psi^\lambda f^T_{-\nu\lambda}\rangle$ + H.c.	44	66
$\epsilon^{\mu\nu\lambda\rho}\langle\bar B_{\bar3}f_{-\mu\nu}u_\lambda\psi_\rho\rangle$	12	22	$i\langle\bar\psi^\mu u^\nu v_\nu\psi^\lambda f^T_{-\mu\lambda}\rangle$	45	67
$\epsilon^{\mu\nu\lambda\rho}\langle\bar B_{\bar3}f_{-\mu\nu}u^\sigma v_\lambda v_\sigma\psi_\rho\rangle$	13	23	$i\langle\bar\psi^\mu v^\nu\psi^\lambda\rangle\langle u_\mu f_{-\nu\lambda}\rangle$ + H.c.		68
$\epsilon^{\mu\nu\lambda\rho}\langle\bar B_{\bar3}\psi_\mu\rangle\langle u_\nu f_{-\lambda\rho}\rangle$		24	$i\langle\bar\psi^\mu v^\nu\psi^\lambda\rangle\langle u_\nu f_{-\mu\lambda}\rangle$		69
$\epsilon^{\mu\nu\lambda\rho}\langle\bar B_{\bar3}v_\mu v^\sigma\psi_\nu\rangle\langle u_\lambda f_{-\rho\sigma}\rangle$		25	$i\langle\bar\psi^\mu v^\nu\psi^\lambda\rangle\langle u_\mu h_{\nu\lambda}\rangle$		70
$\epsilon^{\mu\nu\lambda\rho}\langle\bar B_{\bar3}v_\mu v^\sigma\psi_\nu\rangle\langle u_\lambda h_{\rho\sigma}\rangle$		26	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu\nabla_\nu f_{-\lambda}{}^\sigma v_\rho\psi_\sigma\rangle$ + H.c.	46	71
$\langle\bar B_{\bar3}\nabla^\mu f_{-\mu}{}^\nu\psi_\nu\rangle$	14	27	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu f_{+\nu\lambda}u^\sigma v_\rho\psi_\sigma\rangle$ + H.c.	47	72
$i\langle\bar B_{\bar3}f_+{}^{\mu\nu}u_\mu\psi_\nu\rangle$	15	28	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu f_{+\nu\lambda}u^\sigma v_\sigma\psi_\rho\rangle$ + H.c.	48	73
$i\langle\bar B_{\bar3}f_+{}^{\mu\nu}u^\lambda v_\mu v_\nu\psi_\lambda\rangle$	16	29	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu f_{+\nu}{}^\sigma u_\lambda v_\rho\psi_\sigma\rangle$ + H.c.	49	74
$i\langle\bar B_{\bar3}f_+{}^{\mu\nu}\psi_\mu u^T_\nu\rangle$	17	30	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu f_{+\nu}{}^\sigma u_\sigma v_\lambda\psi_\rho\rangle$ + H.c.	50	75
$i\langle\bar B_{\bar3}f_+{}^{\mu\nu}v_\mu v^\lambda\psi_\nu u^T_\lambda\rangle$	18	31	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu f_{+\nu\lambda}v_\rho\psi^\sigma u^T_\sigma\rangle$ + H.c.	51	76
$i\langle\bar B_{\bar3}u^\mu f_{+\mu}{}^\nu\psi_\nu\rangle$	19	32	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu f_{+\nu}{}^\sigma v_\lambda\psi_\sigma u^T_\rho\rangle$ + H.c.	52	77
$i\langle\bar B_{\bar3}u^\mu f_+{}^{\nu\lambda}v_\mu v_\nu\psi_\lambda\rangle$	20	33	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu v_\nu\psi^\sigma\rangle\langle f_{+\lambda\rho}u_\sigma\rangle$ + H.c.	53	78
$i\langle\bar B_{\bar3}\psi^\mu\rangle\langle f_{+\mu}{}^\nu u_\nu\rangle$	21	34	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu v_\nu\psi^\sigma\rangle\langle f_{+\lambda\sigma}u_\rho\rangle$ + H.c.	54	79
$i\langle\bar B_{\bar3}v^\mu v^\nu\psi^\lambda\rangle\langle f_{+\mu\lambda}u_\nu\rangle$	22	35	$\langle\bar\psi^\mu\nabla_\mu f_+{}^{\nu\lambda}v_\nu\psi_\lambda\rangle$ + H.c.	55	80
$\langle\bar B_{\bar3}u^\mu\chi_+\psi_\mu\rangle$	23	36	$\langle\bar\psi^\mu\nabla^\nu f_{+\nu}{}^\lambda v_\lambda\psi_\mu\rangle$	56	81
$\langle\bar B_{\bar3}u^\mu\psi_\mu\chi^T_+\rangle$	24	37	$\langle\nabla^\mu f_{+\mu}{}^\nu\rangle\langle\bar\psi^\lambda v_\nu\psi_\lambda\rangle$	57	
$\langle\bar B_{\bar3}\chi_+u^\mu\psi_\mu\rangle$	25	38	$\langle\nabla^\mu f_+{}^{\nu\lambda}\rangle\langle\bar\psi_\mu v_\nu\psi_\lambda\rangle$ + H.c.	58	
$\langle\bar B_{\bar3}\psi^\mu\rangle\langle u_\mu\chi_+\rangle$	26	39	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu\chi_+v_\lambda\psi_\rho\rangle$ + H.c.	59	82
$\langle\chi_+\rangle\langle\bar B_{\bar3}u^\mu\psi_\mu\rangle$		40	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu v_\lambda\psi_\rho\chi^T_+\rangle$	60	83
$i\langle\bar B_{\bar3}\nabla^\mu\chi_-\psi_\mu\rangle$	27	41	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu v_\nu\psi_\lambda\rangle\langle u_\rho\chi_+\rangle$	61	84
$i\langle\nabla^\mu\chi_-\rangle\langle\bar B_{\bar3}\psi_\mu\rangle$	28	42	$i\epsilon^{\mu\nu\lambda\rho}\langle\chi_+\rangle\langle\bar\psi_\mu u_\nu v_\lambda\psi_\rho\rangle$		85
$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u_\lambda u^\sigma v_\rho\psi_\sigma\rangle$ + H.c.	29	43	$\langle\bar\psi^\mu u^\nu\chi_-v_\nu\psi_\mu\rangle$ + H.c.	62	86
$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u_\lambda u^\sigma v_\sigma\psi_\rho\rangle$ + H.c.	30	44	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu\nabla_\nu\chi_-v_\lambda\psi_\rho\rangle$	63	87
$i\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma u_\lambda v_\rho\psi_\sigma\rangle$ + H.c.	31	45	$\epsilon^{\mu\nu\lambda\rho}\langle\nabla_\mu\chi_-\rangle\langle\bar\psi_\nu v_\lambda\psi_\rho\rangle$	64	88

APPENDIX B: $\mathcal{O}(p^4)$ ORDER RESULTS

TABLE VIII. Independent terms in the relativistic Lagrangian at the $\mathcal{O}(p^4)$ order. In columns 3, 5, 8, and 10, "I" means that we choose the term as an independent one when employing the heavy-quark symmetry. "P." denotes the parity transformed part and "P.C.H." denotes the part obtained after the parity transformation, charge conjugation, and Hermitian conjugation are performed simultaneously.

O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$	O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$
$\langle \bar{B}_{\bar 3} u_\mu u^\nu u_\nu B_{\bar 3}\rangle$	1		1		$\langle \bar{B}_{\bar 3} u^\mu \nabla_\mu h^{\nu\lambda} D_{\nu\lambda} B_6\rangle + \text{H.c.}$	621		1226	
$\langle \bar{B}_{\bar 3} u^\mu u^\nu u_\mu u_\nu B_{\bar 3}\rangle$	2		2		$\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu h^{\lambda\rho} D_{\mu\nu\lambda\rho} B_6\rangle + \text{H.c.}$	622		1227	
$\langle \bar{B}_{\bar 3} u^\mu u^\nu u_\nu u_\mu B_{\bar 3}\rangle$			3		$i\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu h^{\lambda\rho} \sigma_{\mu} D_{\lambda\rho} B_6\rangle + \text{H.c.}$	623	I	1228	I
$\langle \bar{B}_{\bar 3} u^\mu u_\mu u^\nu u^\lambda D_{\nu\lambda} B_{\bar 3}\rangle + \text{H.c.}$	3		4		$\langle \bar{B}_{\bar 3} u^\mu B_6 \nabla^\nu f^T_{-\mu\nu}\rangle + \text{H.c.}$	624		1229	
$\langle \bar{B}_{\bar 3} u^\mu u^\nu u_\mu u^\lambda D_{\nu\lambda} B_{\bar 3}\rangle + \text{H.c.}$	4		5		$\langle \bar{B}_{\bar 3} u^\mu D_\mu^{\ \nu} B_6 \nabla^\lambda f^T_{-\nu\lambda}\rangle + \text{H.c.}$	625		1230	
$\langle \bar{B}_{\bar 3} u^\mu u^\nu u_\nu u^\lambda D_{\mu\lambda} B_{\bar 3}\rangle$			6		$i\langle \bar{B}_{\bar 3} u^\mu \sigma_\mu^{\ \nu} B_6 \nabla^\lambda f^T_{-\nu\lambda}\rangle + \text{H.c.}$	626	I	1231	I
$\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda u_\mu D_{\nu\lambda} B_{\bar 3}\rangle$			7		$i\langle \bar{B}_{\bar 3} u^\mu \sigma^{\nu\lambda} B_6 \nabla_\mu f^T_{-\nu\lambda}\rangle + \text{H.c.}$	627	I	1232	I
$\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda u^\rho D_{\mu\nu\lambda\rho} B_{\bar 3}\rangle$	5		8		$\langle \bar{B}_{\bar 3} f_-^{\ \mu\nu} f_{-\mu\nu} B_6\rangle + \text{H.c.}$			1233	
$i\langle \bar{B}_{\bar 3} u^\mu u_\mu u^\nu u^\lambda \sigma_{\nu\lambda} B_{\bar 3}\rangle + \text{H.c.}$	6		9		$\langle \bar{B}_{\bar 3} f_-^{\ \mu\nu} f_{-\mu}^{\ \ \lambda} D_{\nu\lambda} B_6\rangle + \text{H.c.}$			1234	
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu u_\mu u^\lambda \sigma_{\nu\lambda} B_{\bar 3}\rangle + \text{H.c.}$	7		10		$i\langle \bar{B}_{\bar 3} f_-^{\ \mu\nu} f_{-\mu}^{\ \ \lambda} \sigma_{\nu\lambda} B_6\rangle + \text{H.c.}$	628	I	1235	I
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu u_\nu u^\lambda \sigma_{\mu\lambda} B_{\bar 3}\rangle$			11		$i\langle \bar{B}_{\bar 3} f_-^{\ \mu\nu} f_{-\mu}^{\ \ \lambda\rho} \sigma_{\mu\lambda} D_{\nu\rho} B_6\rangle + \text{H.c.}$	629	I	1236	I
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda u_\mu \sigma_{\nu\lambda} B_{\bar 3}\rangle$			12		$\langle \bar{B}_{\bar 3} f_-^{\ \mu\nu} h_\mu^{\ \lambda} D_{\nu\lambda} B_6\rangle + \text{H.c.}$	630		1237	
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda u^\rho \sigma_{\mu\nu} D_{\lambda\rho} B_{\bar 3}\rangle + \text{H.c.}$	8		13		$i\langle \bar{B}_{\bar 3} f_-^{\ \mu\nu} h_\mu^{\ \lambda} \sigma_{\nu\lambda} B_6\rangle + \text{H.c.}$	631	I	1238	I
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda u^\rho \sigma_{\mu\lambda} D_{\nu\rho} B_{\bar 3}\rangle + \text{H.c.}$	9		14		$i\langle \bar{B}_{\bar 3} f_-^{\ \mu\nu} h^{\lambda\rho} \sigma_{\mu\nu} D_{\lambda\rho} B_6\rangle + \text{H.c.}$	632	I	1239	I
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda u^\rho \sigma_{\mu\rho} D_{\nu\lambda} B_{\bar 3}\rangle$			15		$i\langle \bar{B}_{\bar 3} f_-^{\ \mu\nu} h^{\lambda\rho} \sigma_{\mu\lambda} D_{\nu\rho} B_6\rangle + \text{H.c.}$	633	I	1240	I
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda u^\rho \sigma_{\nu\lambda} D_{\mu\rho} B_{\bar 3}\rangle$			16		$i\langle \bar{B}_{\bar 3} f_-^{\ \mu\nu} \sigma_\mu^{\ \lambda} B_6 f^T_{-\nu\lambda}\rangle + \text{H.c.}$	634	I	1241	I
$\langle \bar{B}_{\bar 3} u^\mu u_\mu u^\nu B_{\bar 3} u^T_{\ \nu}\rangle + \text{H.c.}$	10		17		$i\langle \bar{B}_{\bar 3} f_-^{\ \mu\nu} \sigma_\mu^{\ \lambda} B_6 h^T_{\ \nu\lambda}\rangle + \text{H.c.}$	635	I	1242	I
$\langle \bar{B}_{\bar 3} u^\mu u^\nu u_\mu B_{\bar 3} u^T_{\ \nu}\rangle$	11		18		$i\langle \bar{B}_{\bar 3} f_-^{\ \mu\nu} \sigma_\mu^{\ \lambda} D_\nu^{\ \rho} B_6 f^T_{-\lambda\rho}\rangle + \text{H.c.}$	636	I	1243	I
$\langle \bar{B}_{\bar 3} u^\mu u_\mu u^\nu D_\nu^{\ \lambda} B_{\bar 3} u^T_{\ \lambda}\rangle$	12		19		$\langle \bar{B}_{\bar 3} \nabla^\mu f_{-\mu}^{\ \ \nu} u_\nu B_6\rangle + \text{H.c.}$	637		1244	
$\langle \bar{B}_{\bar 3} u^\mu u^\nu u_\mu D_\nu^{\ \lambda} B_{\bar 3} u^T_{\ \lambda}\rangle$	13		20		$\langle \bar{B}_{\bar 3} \nabla^\mu f_{-\mu}^{\ \ \nu} u^\lambda D_{\nu\lambda} B_6\rangle + \text{H.c.}$	638		1245	
$\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda D_{\mu\nu} B_{\bar 3} u^T_{\ \lambda}\rangle + \text{H.c.}$	14		21		$i\langle \bar{B}_{\bar 3} \nabla^\mu f_{-\mu}^{\ \ \nu} u^\lambda \sigma_{\nu\lambda} B_6\rangle + \text{H.c.}$	639	I	1246	I
$\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda D_{\mu\lambda} B_{\bar 3} u^T_{\ \nu}\rangle$			22		$i\langle \bar{B}_{\bar 3} \nabla^\mu f_-^{\ \nu\lambda} u_\mu \sigma_{\nu\lambda} B_6\rangle + \text{H.c.}$	640	I	1247	I
$\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda D_{\mu\nu\lambda}^{\ \ \ \ \rho} B_{\bar 3} u^T_{\ \rho}\rangle$	15		23		$i\langle \bar{B}_{\bar 3} h^{\mu\nu} f_{-\mu}^{\ \ \lambda} \sigma_{\nu\lambda} B_6\rangle + \text{H.c.}$	641	I	1248	I
$i\langle \bar{B}_{\bar 3} u^\mu u_\mu u^\nu \sigma_\nu^{\ \lambda} B_{\bar 3} u^T_{\ \lambda}\rangle + \text{H.c.}$			24		$\langle \bar{B}_{\bar 3} h^{\mu\nu} h_{\mu\nu} B_6\rangle + \text{H.c.}$	642		1249	
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda \sigma_{\mu\nu} B_{\bar 3} u^T_{\ \lambda}\rangle + \text{H.c.}$			25		$i\langle \bar{B}_{\bar 3} h^{\mu\nu} h_\mu^{\ \lambda} \sigma_{\nu\lambda} B_6\rangle + \text{H.c.}$	643	I	1250	I
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda \sigma_{\mu\lambda} B_{\bar 3} u^T_{\ \nu}\rangle$			26		$i\langle \bar{B}_{\bar 3} h^{\mu\nu} \sigma_\mu^{\ \lambda} B_6 h^T_{\ \nu\lambda}\rangle + \text{H.c.}$	644	I	1251	I
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda \sigma_{\mu\nu} D_\lambda^{\ \rho} B_{\bar 3} u^T_{\ \rho}\rangle + \text{H.c.}$			27		$\langle \bar{B}_{\bar 3} B_6\rangle\langle u^\mu \nabla^\nu f_{-\mu\nu}\rangle + \text{H.c.}$			1252	
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda \sigma_{\mu\lambda} D_\nu^{\ \rho} B_{\bar 3} u^T_{\ \rho}\rangle$			28		$\langle \bar{B}_{\bar 3} B_6\rangle\langle h^{\mu\nu} h_{\mu\nu}\rangle + \text{H.c.}$			1253	
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu u^\lambda \sigma_\mu^{\ \rho} D_{\nu\lambda} B_{\bar 3} u^T_{\ \rho}\rangle + \text{H.c.}$			29		$\langle \bar{B}_{\bar 3} D^{\mu\nu} B_6\rangle\langle u_\mu \nabla^\lambda f_{-\nu\lambda}\rangle + \text{H.c.}$			1254	
$\langle \bar{B}_{\bar 3} u^\mu u_\mu B_{\bar 3} u^{T\nu} u^T_{\ \nu}\rangle$			30		$\langle \bar{B}_{\bar 3} D^{\mu\nu} B_6\rangle\langle u^\lambda \nabla_\mu f_{-\nu\lambda}\rangle + \text{H.c.}$			1255	
$\langle \bar{B}_{\bar 3} u^\mu u^\nu B_{\bar 3} u^T_{\ \mu} u^T_{\ \nu}\rangle$	16		31		$\langle \bar{B}_{\bar 3} D^{\mu\nu} B_6\rangle\langle u^\lambda \nabla_\mu h_{\nu\lambda}\rangle + \text{H.c.}$			1256	
$\langle \bar{B}_{\bar 3} u^\mu u^\nu B_{\bar 3} u^T_{\ \nu} u^T_{\ \mu}\rangle$			32		$\langle \bar{B}_{\bar 3} D^{\mu\nu\lambda\rho} B_6\rangle\langle u_\mu \nabla_\nu h_{\lambda\rho}\rangle + \text{H.c.}$			1257	
$\langle \bar{B}_{\bar 3} u^\mu u_\mu D^{\nu\lambda} B_{\bar 3} u^T_{\ \nu} u^T_{\ \lambda}\rangle$			33		$i\langle u^\mu \nabla_\mu f_-^{\ \nu\lambda}\rangle\langle \bar{B}_{\bar 3} \sigma_{\nu\lambda} B_6\rangle + \text{H.c.}$			1258	I
$\langle \bar{B}_{\bar 3} u^\mu u^\nu D_\mu^{\ \lambda} B_{\bar 3} u^T_{\ \nu} u^T_{\ \lambda}\rangle + \text{H.c.}$	17		34		$i\langle u^\mu \nabla^\nu f_{-\nu}^{\ \ \lambda}\rangle\langle \bar{B}_{\bar 3} \sigma_{\mu\lambda} B_6\rangle + \text{H.c.}$			1259	I
$\langle \bar{B}_{\bar 3} u^\mu u^\nu D_\mu^{\ \lambda} B_{\bar 3} u^T_{\ \lambda} u^T_{\ \nu}\rangle + \text{H.c.}$			35		$i\langle u^\mu \nabla^\nu f_-^{\ \lambda\rho}\rangle\langle \bar{B}_{\bar 3} \sigma_{\mu\lambda} D_{\nu\rho} B_6\rangle + \text{H.c.}$			1260	I
$\langle \bar{B}_{\bar 3} u^\mu u^\nu D_{\mu\nu}^{\ \ \lambda\rho} B_{\bar 3} u^T_{\ \lambda} u^T_{\ \rho}\rangle$			36		$i\langle u^\mu \nabla^\nu f_-^{\ \lambda\rho}\rangle\langle \bar{B}_{\bar 3} \sigma_{\nu\lambda} D_{\mu\rho} B_6\rangle + \text{H.c.}$			1261	I
$i\langle \bar{B}_{\bar 3} u^\mu u_\mu \sigma^{\nu\lambda} B_{\bar 3} u^T_{\ \nu} u^T_{\ \lambda}\rangle$			37		$i\langle f_-^{\ \mu\nu} h_\mu^{\ \lambda}\rangle\langle \bar{B}_{\bar 3} \sigma_{\nu\lambda} B_6\rangle + \text{H.c.}$			1262	I
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu \sigma_\mu^{\ \lambda} B_{\bar 3} u^T_{\ \lambda} u^T_{\ \nu}\rangle + \text{H.c.}$			38		$\langle \bar{B}_{\bar 3} \nabla^\mu \nabla_\mu f_-^{\ \nu\lambda} \gamma_5 \gamma_\nu D_\lambda B_6\rangle + \text{H.c.}$	645	I	1263	I
$i\langle \bar{B}_{\bar 3} u^\mu u^\nu \sigma_{\mu\nu} D^{\lambda\rho} B_{\bar 3} u^T_{\ \lambda} u^T_{\ \rho}\rangle$			39		$i\langle \bar{B}_{\bar 3} f_+^{\ \mu\nu} u_\mu u_\nu B_6\rangle + \text{H.c.}$	646		1264	

(Table continued)

TABLE VIII. *(Continued)*

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$i\langle\bar{B}_{\bar3}u^\mu u^\nu\sigma_\mu{}^\lambda D_\nu{}^\rho B_{\bar3}u^T_\lambda u^T_\rho\rangle$ + H.c.			40		$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u_\mu u^\lambda D_{\nu\lambda}B_6\rangle$ + H.c.	647		1265	
$\langle\bar{B}_{\bar3}u^\mu B_{\bar3}\rangle\langle u_\mu u^\nu u_\nu\rangle$			41		$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u^\lambda u_\mu D_{\nu\lambda}B_6\rangle$ + H.c.	648		1266	
$\langle\bar{B}_{\bar3}u^\mu D_\mu{}^\nu B_{\bar3}\rangle\langle u_\nu u^\lambda u_\lambda\rangle$			42		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u_\mu u^\lambda\sigma_{\nu\lambda}B_6\rangle$ + H.c.	649	I	1267	I
$\langle\bar{B}_{\bar3}u^\mu D^{\nu\lambda} B_{\bar3}\rangle\langle u_\mu u_\nu u_\lambda\rangle$			43		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u^\lambda u_\mu\sigma_{\nu\lambda}B_6\rangle$ + H.c.	650	I	1268	I
$\langle\bar{B}_{\bar3}u^\mu D_\mu{}^{\nu\lambda\rho} B_{\bar3}\rangle\langle u_\nu u_\lambda u_\rho\rangle$			44		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u^\lambda u_\lambda\sigma_{\mu\nu}B_6\rangle$ + H.c.	651	I	1269	I
$\langle\bar{B}_{\bar3}B_{\bar3}\rangle\langle u^\mu u_\mu\rangle\langle u^\nu u_\nu\rangle$			45		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\nu}D_{\lambda\rho}B_6\rangle$ + H.c.	652	I	1270	I
$\langle\bar{B}_{\bar3}B_{\bar3}\rangle\langle u^\mu u^\nu\rangle\langle u_\mu u_\nu\rangle$			46		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\lambda}D_{\nu\rho}B_6\rangle$ + H.c.	653	I	1271	I
$\langle\bar{B}_{\bar3}B_{\bar3}\rangle\langle u^\mu u_\mu u^\nu u_\nu\rangle$			47		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\rho}D_{\nu\lambda}B_6\rangle$ + H.c.	654	I	1272	I
$\langle\bar{B}_{\bar3}D^{\mu\nu}B_{\bar3}\rangle\langle u_\mu u_\nu\rangle\langle u^\lambda u_\lambda\rangle$			48		$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u_\mu B_6 u^T_\nu\rangle$ + H.c.	655		1273	
$\langle\bar{B}_{\bar3}D^{\mu\nu}B_{\bar3}\rangle\langle u_\mu u^\lambda\rangle\langle u_\nu u_\lambda\rangle$			49		$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u_\mu D_\nu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.	656		1274	
$\langle\bar{B}_{\bar3}D^{\mu\nu}B_{\bar3}\rangle\langle u_\mu u_\nu u^\lambda u_\lambda\rangle$			50		$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u^\lambda D_{\mu\lambda}B_6 u^T_\nu\rangle$ + H.c.	657		1275	
$\langle\bar{B}_{\bar3}D^{\mu\nu\lambda\rho}B_{\bar3}\rangle\langle u_\mu u_\nu\rangle\langle u_\lambda u_\rho\rangle$			51		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u_\mu\sigma_\nu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.	658	I	1276	I
$i\langle\bar{B}_{\bar3}\sigma^{\mu\nu}B_{\bar3}\rangle\langle u_\mu u_\nu u^\lambda u_\lambda\rangle$			52		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\nu}B_6 u^T_\lambda\rangle$ + H.c.	659	I	1277	I
$i\langle\bar{B}_{\bar3}\sigma^{\mu\nu}D^{\lambda\rho}B_{\bar3}\rangle\langle u_\mu u_\nu u_\lambda u_\rho\rangle$			53		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\lambda}B_6 u^T_\nu\rangle$ + H.c.	660	I	1278	I
$i\langle u^\mu u_\mu\rangle\langle\bar{B}_{\bar3}u^\nu u^\lambda\sigma_{\nu\lambda}B_{\bar3}\rangle$			54		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\nu}D_\lambda{}^\rho B_6 u^T_\rho\rangle$ + H.c.	661	I	1279	I
$i\langle u^\mu u^\nu\rangle\langle\bar{B}_{\bar3}u^\lambda u^\rho\sigma_{\mu\lambda}D_{\nu\rho}B_{\bar3}\rangle$ + H.c.			55		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\lambda}D_\nu{}^\rho B_6 u^T_\rho\rangle$ + H.c.	662	I	1280	I
$\langle u^\mu u_\mu\rangle\langle\bar{B}_{\bar3}u^\nu B_{\bar3}u^T_\nu\rangle$			56		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}u^\lambda\sigma_\mu{}^\rho D_{\nu\lambda}B_6 u^T_\rho\rangle$ + H.c.	663	I	1281	I
$\langle u^\mu u_\mu\rangle\langle\bar{B}_{\bar3}u^\nu D_\nu{}^\lambda B_{\bar3}u^T_\lambda\rangle$			57		$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}B_6 u^T_\mu u^T_\nu\rangle$ + H.c.	664		1282	
$\langle\bar{B}_{\bar3}u^\mu u_\mu f_-{}^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_{\bar3}\rangle$ + H.c.			58		$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}D_\mu B_6 u^T_\nu u^T_\lambda\rangle$ + H.c.	665		1283	
$\langle\bar{B}_{\bar3}u^\mu u^\nu f_{-\mu}{}^\lambda\gamma_5\gamma_\nu D_\lambda B_{\bar3}\rangle$ + H.c.	18		59		$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}D_\lambda B_6 u^T_\lambda u^T_\nu\rangle$ + H.c.			1284	
$\langle\bar{B}_{\bar3}u^\mu u^\nu f_{-\mu}{}^\lambda\gamma_5\gamma_\lambda D_\nu B_{\bar3}\rangle$ + H.c.	19		60		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}\sigma_{\mu\nu}B_6 u^{T\lambda}u^T_\lambda\rangle$ + H.c.			1285	I
$\langle\bar{B}_{\bar3}u^\mu u^\nu f_{-\nu}{}^\lambda\gamma_5\gamma_\mu D_\lambda B_{\bar3}\rangle$ + H.c.			61		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}\sigma_\mu{}^\lambda B_6 u^T_\nu u^T_\lambda\rangle$ + H.c.	666	I	1286	I
$\langle\bar{B}_{\bar3}u^\mu u^\nu f_{-\nu}{}^\lambda\gamma_5\gamma_\lambda D_\mu B_{\bar3}\rangle$ + H.c.			62		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}\sigma_\mu{}^\lambda B_6 u^T_\lambda u^T_\nu\rangle$ + H.c.			1287	I
$\langle\bar{B}_{\bar3}u^\mu u^\nu f_-{}^{\lambda\rho}\gamma_5\gamma_\lambda D_{\mu\nu\rho}B_{\bar3}\rangle$ + H.c.			63		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}\sigma_{\mu\nu}D^{\lambda\rho}B_6 u^T_\lambda u^T_\rho\rangle$ + H.c.			1288	I
$\langle\bar{B}_{\bar3}u^\mu u_\mu h^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_{\bar3}\rangle$ + H.c.			64		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}\sigma_\mu{}^\lambda D_\nu{}^\rho B_6 u^T_\lambda u^T_\rho\rangle$ + H.c.	667	I	1289	I
$\langle\bar{B}_{\bar3}u^\mu u^\nu h_\mu{}^\lambda\gamma_5\gamma_\nu D_\lambda B_{\bar3}\rangle$ + H.c.	20		65		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}\sigma_\mu{}^\lambda D_\nu{}^\rho B_6 u^T_\rho u^T_\lambda\rangle$ + H.c.			1290	I
$\langle\bar{B}_{\bar3}u^\mu u^\nu h_\mu{}^\lambda\gamma_5\gamma_\lambda D_\nu B_{\bar3}\rangle$ + H.c.	21		66		$i\langle\bar{B}_{\bar3}u^\mu f_{+\mu}{}^\nu u_\nu B_6\rangle$ + H.c.	668		1291	
$\langle\bar{B}_{\bar3}u^\mu u^\nu h_\nu{}^\lambda\gamma_5\gamma_\mu D_\lambda B_{\bar3}\rangle$ + H.c.			67		$i\langle\bar{B}_{\bar3}u^\mu f_{+\mu}{}^\nu u^\lambda D_{\nu\lambda}B_6\rangle$ + H.c.	669		1292	
$\langle\bar{B}_{\bar3}u^\mu u^\nu h_\nu{}^\lambda\gamma_5\gamma_\lambda D_\mu B_{\bar3}\rangle$ + H.c.			68		$i\langle\bar{B}_{\bar3}u^\mu f_+{}^{\nu\lambda}u_\nu D_{\mu\lambda}B_6\rangle$ + H.c.	670		1293	
$\langle\bar{B}_{\bar3}u^\mu u^\nu h^{\lambda\rho}\gamma_5\gamma_\mu D_{\nu\lambda\rho}B_{\bar3}\rangle$ + H.c.	22		69		$\langle\bar{B}_{\bar3}u^\mu f_{+\mu}{}^\nu u^\lambda\sigma_{\nu\lambda}B_6\rangle$ + H.c.	671	I	1294	I
$\langle\bar{B}_{\bar3}u^\mu u^\nu h^{\lambda\rho}\gamma_5\gamma_\nu D_{\mu\lambda\rho}B_{\bar3}\rangle$ + H.c.			70		$\langle\bar{B}_{\bar3}u^\mu f_+{}^{\nu\lambda}u_\mu\sigma_{\nu\lambda}B_6\rangle$ + H.c.	672	I	1295	I
$\langle\bar{B}_{\bar3}u^\mu u^\nu h^{\lambda\rho}\gamma_5\gamma_\lambda D_{\mu\nu\rho}B_{\bar3}\rangle$ + H.c.			71		$\langle\bar{B}_{\bar3}u^\mu f_+{}^{\nu\lambda}u_\nu\sigma_{\mu\lambda}B_6\rangle$ + H.c.	673	I	1296	I
$\langle\bar{B}_{\bar3}u^\mu u^\nu\gamma_5\gamma_\mu D^\lambda B_{\bar3}f^T_{-\nu\lambda}\rangle$ + H.c.	23		72		$\langle\bar{B}_{\bar3}u^\mu f_+{}^{\nu\lambda}u^\rho\sigma_{\mu\nu}D_{\lambda\rho}B_6\rangle$ + H.c.	674	I	1297	I
$\langle\bar{B}_{\bar3}u^\mu u^\nu\gamma_5\gamma^\lambda D_\mu B_{\bar3}f^T_{-\nu\lambda}\rangle$ + H.c.	24		73		$\langle\bar{B}_{\bar3}u^\mu f_+{}^{\nu\lambda}u^\rho\sigma_{\nu\lambda}D_{\mu\rho}B_6\rangle$ + H.c.	675	I	1298	I
$\langle\bar{B}_{\bar3}u^\mu u^\nu\gamma_5\gamma^\lambda D_\mu B_{\bar3}h^T_{\nu\lambda}\rangle$ + H.c.	25		74		$\langle\bar{B}_{\bar3}u^\mu f_+{}^{\nu\lambda}u^\rho\sigma_{\nu\rho}D_{\mu\lambda}B_6\rangle$ + H.c.	676	I	1299	I
$\langle\bar{B}_{\bar3}u^\mu f_{-\mu}{}^\lambda u^\nu\gamma_5\gamma_\nu D_\lambda B_{\bar3}\rangle$ + H.c.			75		$i\langle\bar{B}_{\bar3}u^\mu f_{+\mu}{}^\nu B_6 u^T_\nu\rangle$ + H.c.	677		1300	
$\langle\bar{B}_{\bar3}u^\mu f_{-\mu}{}^\lambda u^\nu\gamma_5\gamma_\lambda D_\nu B_{\bar3}\rangle$ + H.c.			76		$i\langle\bar{B}_{\bar3}u^\mu f_{+\mu}{}^\nu D_\nu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.	678		1301	
$\langle\bar{B}_{\bar3}u^\mu f_{-\mu}{}^\nu\gamma_5\gamma_\nu D^\lambda B_{\bar3}u^T_\lambda\rangle$ + H.c.	26		77		$i\langle\bar{B}_{\bar3}u^\mu f_+{}^{\nu\lambda}D_{\mu\nu}B_6 u^T_\lambda\rangle$ + H.c.			1302	
$\langle\bar{B}_{\bar3}u^\mu f_{-\mu}{}^\nu\gamma_5\gamma^\lambda D_\nu B_{\bar3}u^T_\lambda\rangle$ + H.c.	27		78		$\langle\bar{B}_{\bar3}u^\mu f_{+\mu}{}^\nu\sigma_\nu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.	679	I	1303	I
$\langle\bar{B}_{\bar3}u^\mu f_-{}^{\nu\lambda}\gamma_5\gamma_\mu D_\nu B_{\bar3}u^T_\lambda\rangle$ + H.c.	28		79		$\langle\bar{B}_{\bar3}u^\mu f_+{}^{\nu\lambda}\sigma_{\mu\nu}B_6 u^T_\lambda\rangle$ + H.c.			1304	I
$\langle\bar{B}_{\bar3}u^\mu f_-{}^{\nu\lambda}\gamma_5\gamma_\nu D_\mu B_{\bar3}u^T_\lambda\rangle$ + H.c.	29		80		$\langle\bar{B}_{\bar3}u^\mu f_+{}^{\nu\lambda}\sigma_{\nu\lambda}B_6 u^T_\mu\rangle$ + H.c.			1305	I
$\langle\bar{B}_{\bar3}u^\mu f_-{}^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_{\bar3}u^T_\mu\rangle$ + H.c.	30		81		$\langle\bar{B}_{\bar3}u^\mu f_+{}^{\nu\lambda}\sigma_{\mu\nu}D_\lambda{}^\rho B_6 u^T_\rho\rangle$ + H.c.	680	I	1306	I
$\langle\bar{B}_{\bar3}u^\mu f_-{}^{\nu\lambda}\gamma_5\gamma_\nu D_{\mu\lambda}{}^\rho B_{\bar3}u^T_\rho\rangle$ + H.c.	31		82		$\langle\bar{B}_{\bar3}u^\mu f_+{}^{\nu\lambda}\sigma_{\nu\lambda}D_\mu{}^\rho B_6 u^T_\rho\rangle$ + H.c.			1307	I
$\langle\bar{B}_{\bar3}u^\mu h_\mu{}^\nu u^\lambda\gamma_5\gamma_\nu D_\lambda B_{\bar3}\rangle$ + H.c.			83		$\langle\bar{B}_{\bar3}u^\mu f_+{}^{\nu\lambda}\sigma_\nu{}^\rho D_{\mu\lambda}B_6 u^T_\rho\rangle$ + H.c.			1308	I
$\langle\bar{B}_{\bar3}u^\mu h_\mu{}^\nu\gamma_5\gamma_\nu D^\lambda B_{\bar3}u^T_\lambda\rangle$ + H.c.	32		84		$i\langle\bar{B}_{\bar3}u^\mu u^\nu f_{+\mu\nu}B_6\rangle$ + H.c.			1309	

(Table continued)

TABLE VIII. (Continued)

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$\langle \bar{B}_{\bar 3} u^\mu h_\mu{}^\nu \gamma_5 \gamma^\lambda D_\nu B_{\bar 3} u^T{}_\lambda \rangle$ + H.c.	33		85		$i\langle \bar{B}_{\bar 3} u^\mu u^\nu f_{+\mu}{}^\lambda D_{\nu\lambda} B_6 \rangle$ + H.c.			1310	
$\langle \bar{B}_{\bar 3} u^\mu h^{\nu\lambda} \gamma_5 \gamma_\mu D_\nu B_{\bar 3} u^T{}_\lambda \rangle$ + H.c.	34		86		$i\langle \bar{B}_{\bar 3} u^\mu u^\nu f_{+\nu}{}^\lambda D_{\mu\lambda} B_6 \rangle$ + H.c.			1311	
$\langle \bar{B}_{\bar 3} u^\mu h^{\nu\lambda} \gamma_5 \gamma_\nu D_\mu B_{\bar 3} u^T{}_\lambda \rangle$ + H.c.	35		87		$\langle \bar{B}_{\bar 3} u^\mu u_\mu f_+{}^{\nu\lambda} \sigma_{\nu\lambda} B_6 \rangle$ + H.c.			1312	I
$\langle \bar{B}_{\bar 3} u^\mu h^{\nu\lambda} \gamma_5 \gamma_\mu D_{\nu\lambda}{}^\rho B_{\bar 3} u^T{}_\rho \rangle$ + H.c.	36		88		$\langle \bar{B}_{\bar 3} u^\mu u^\nu f_{+\mu}{}^\lambda \sigma_{\nu\lambda} B_6 \rangle$ + H.c.			1313	I
$\langle \bar{B}_{\bar 3} u^\mu h^\nu{}^\lambda \gamma_5 \gamma^\rho D_{\mu\nu\lambda} B_{\bar 3} u^T{}_\rho \rangle$ + H.c.	37		89		$\langle \bar{B}_{\bar 3} u^\mu u^\nu f_{+\nu}{}^\lambda \sigma_{\mu\lambda} B_6 \rangle$ + H.c.			1314	I
$\langle \bar{B}_{\bar 3} \gamma_5 \gamma^\mu D^\nu B_{\bar 3} \rangle \langle u_\mu u^\lambda f_{-\nu\lambda} \rangle$ + H.c.			90		$\langle \bar{B}_{\bar 3} u^\mu u^\nu f_+{}^{\lambda\rho} \sigma_{\mu\lambda} D_{\nu\rho} B_6 \rangle$ + H.c.			1315	I
$\langle \bar{B}_{\bar 3} \gamma_5 \gamma^\mu D^\nu B_{\bar 3} \rangle \langle u_\nu u^\lambda f_{-\mu\lambda} \rangle$ + H.c.			91		$\langle \bar{B}_{\bar 3} u^\mu u^\nu f_+{}^{\lambda\rho} \sigma_{\nu\lambda} D_{\mu\rho} B_6 \rangle$ + H.c.			1316	I
$\langle \bar{B}_{\bar 3} \gamma_5 \gamma^\mu D^\nu B_{\bar 3} \rangle \langle u_\mu u^\lambda h_{\nu\lambda} \rangle$ + H.c.			92		$\langle \bar{B}_{\bar 3} u^\mu u^\nu f_+{}^{\lambda\rho} \sigma_{\lambda\rho} D_{\mu\nu} B_6 \rangle$ + H.c.			1317	I
$\langle \bar{B}_{\bar 3} \gamma_5 \gamma^\mu D^\nu B_{\bar 3} \rangle \langle u_\nu u^\lambda h_{\mu\lambda} \rangle$ + H.c.			93		$i\langle \bar{B}_{\bar 3} B_6 \rangle \langle f_+{}^{\mu\nu} u_\mu u_\nu \rangle$ + H.c.			1318	
$\langle \bar{B}_{\bar 3} \gamma_5 \gamma^\mu D^{\nu\lambda\rho} B_{\bar 3} \rangle \langle u_\mu u_\nu h_{\lambda\rho} \rangle$ + H.c.			94		$i\langle \bar{B}_{\bar 3} D^{\mu\nu} B_6 \rangle \langle f_{+\mu}{}^\lambda u_\nu u_\lambda \rangle$ + H.c.			1319	
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar 3} u_\mu u_\nu f_{-\lambda\rho} B_{\bar 3} \rangle$ + H.c.	38		95		$i\langle \bar{B}_{\bar 3} D^{\mu\nu} B_6 \rangle \langle f_{+\mu}{}^\lambda u_\lambda u_\nu \rangle$ + H.c.			1320	
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar 3} u_\mu u_\nu f_{-\lambda}{}^\sigma D_{\rho\sigma} B_{\bar 3} \rangle$ + H.c.	39		96		$\langle \bar{B}_{\bar 3} \sigma^{\mu\nu} B_6 \rangle \langle f_{+\mu\nu} u^\lambda u_\lambda \rangle$ + H.c.			1321	I
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar 3} u_\mu u^\sigma f_{-\nu\lambda} D_{\rho\sigma} B_{\bar 3} \rangle$ + H.c.	40		97		$\langle \bar{B}_{\bar 3} \sigma^{\mu\nu} B_6 \rangle \langle f_{+\mu}{}^\nu u_\nu u_\lambda \rangle$ + H.c.			1322	I
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar 3} u_\mu u_\nu h_\lambda{}^\sigma D_{\rho\sigma} B_{\bar 3} \rangle$ + H.c.	41		98		$\langle \bar{B}_{\bar 3} \sigma^{\mu\nu} B_6 \rangle \langle f_{+\mu}{}^\lambda u_\lambda u_\nu \rangle$ + H.c.			1323	I
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar 3} u_\mu u^\sigma D_{\nu\sigma} B_{\bar 3} f^T_{-\lambda\rho} \rangle$ + H.c.			99		$\langle \bar{B}_{\bar 3} \sigma^{\mu\nu} D^{\lambda\rho} B_6 \rangle \langle f_{+\mu\nu} u_\lambda u_\rho \rangle$ + H.c.			1324	I
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar 3} u_\mu f_{-\nu\lambda} u^\sigma D_{\rho\sigma} B_{\bar 3} \rangle$ + H.c.	42		100		$\langle \bar{B}_{\bar 3} \sigma^{\mu\nu} D^{\lambda\rho} B_6 \rangle \langle f_{+\mu\lambda} u_\nu u_\rho \rangle$ + H.c.			1325	I
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar 3} u_\mu f_{-\nu\lambda} B_{\bar 3} u^T{}_\rho \rangle$ + H.c.			101		$\langle \bar{B}_{\bar 3} \sigma^{\mu\nu} D^{\lambda\rho} B_6 \rangle \langle f_{+\mu\lambda} u_\rho u_\nu \rangle$ + H.c.			1326	I
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar 3} u_\mu f_{-\nu\lambda} D_\rho{}^\sigma B_{\bar 3} u^T{}_\sigma \rangle$ + H.c.			102		$i\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar 3} u_\mu u_\nu B_6 \rangle$ + H.c.			1327	
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar 3} u_\mu f_{-\nu}{}^\sigma D_{\lambda\sigma} B_{\bar 3} u^T{}_\rho \rangle$ + H.c.			103		$i\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar 3} u_\mu u^\lambda D_{\nu\lambda} B_6 \rangle$ + H.c.			1328	
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar 3} u_\mu h_\nu{}^\sigma D_{\lambda\sigma} B_{\bar 3} u^T{}_\rho \rangle$ + H.c.			104		$i\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar 3} u^\lambda u_\mu D_{\nu\lambda} B_6 \rangle$ + H.c.			1329	
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar 3} D_\mu{}^\sigma B_{\bar 3} \rangle \langle u_\nu u_\sigma f_{-\lambda\rho} \rangle$ + H.c.			105		$\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar 3} u_\mu u^\lambda \sigma_{\nu\lambda} B_6 \rangle$ + H.c.			1330	
$\epsilon^{\mu\nu\lambda\rho} \langle u_\mu u^\sigma \rangle \langle \bar{B}_{\bar 3} f_{-\nu\lambda} D_{\rho\sigma} B_{\bar 3} \rangle$			106		$\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar 3} u^\lambda u_\mu \sigma_{\nu\lambda} B_6 \rangle$ + H.c.			1331	
$\epsilon^{\mu\nu\lambda\rho} \langle u_\mu f_{-\nu\lambda} \rangle \langle \bar{B}_{\bar 3} u_\rho B_{\bar 3} \rangle$			107		$\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar 3} u^\lambda u_\lambda \sigma_{\mu\nu} B_6 \rangle$ + H.c.			1332	
$\epsilon^{\mu\nu\lambda\rho} \langle u_\mu f_{-\nu\lambda} \rangle \langle \bar{B}_{\bar 3} u^\sigma D_{\rho\sigma} B_{\bar 3} \rangle$			108		$\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar 3} u^\lambda u^\rho \sigma_{\mu\nu} D_{\lambda\rho} B_6 \rangle$ + H.c.			1333	
$\epsilon^{\mu\nu\lambda\rho} \langle u_\mu h_\nu{}^\sigma \rangle \langle \bar{B}_{\bar 3} u_\lambda D_{\rho\sigma} B_{\bar 3} \rangle$			109		$\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar 3} u^\lambda u^\rho \sigma_{\mu\lambda} D_{\nu\rho} B_6 \rangle$ + H.c.			1334	
$\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu f_{-\mu\nu} B_{\bar 3} \rangle$ + H.c.	43		110		$\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar 3} u^\lambda u^\rho \sigma_{\mu\rho} D_{\nu\lambda} B_6 \rangle$ + H.c.			1335	
$\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu f_{-\mu}{}^\lambda D_{\nu\lambda} B_{\bar 3} \rangle$ + H.c.	44		111		$i\langle f_+{}^{\mu\nu} u_\mu \rangle \langle \bar{B}_{\bar 3} u_\nu B_6 \rangle$ + H.c.			1336	
$\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu f_{-\nu}{}^\lambda D_{\mu\lambda} B_{\bar 3} \rangle$ + H.c.	45		112		$i\langle f_+{}^{\mu\nu} u_\mu \rangle \langle \bar{B}_{\bar 3} u_\nu{}^\lambda B_6 u^T{}_\lambda \rangle$ + H.c.			1337	
$i\langle \bar{B}_{\bar 3} u^\mu \nabla_\mu f_-{}^\lambda \sigma_{\nu\lambda} B_{\bar 3} \rangle$ + H.c.	46		113		$\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar 3} u_\mu \sigma_\nu{}^\lambda B_6 u^T{}_\lambda \rangle$ + H.c.			1338	
$i\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu f_{-\nu}{}^\lambda \sigma_{\mu\lambda} B_{\bar 3} \rangle$ + H.c.	47		114		$\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar 3} \sigma_{\mu\lambda} D_\nu{}^\rho B_6 u^T{}_\rho \rangle$ + H.c.			1339	
$i\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu f_-{}^{\lambda\rho} \sigma_{\mu\lambda} D_{\nu\rho} B_{\bar 3} \rangle$ + H.c.	48		115		$i\langle f_+{}^{\mu\nu} \rangle \langle \bar{B}_{\bar 3} D_\mu{}^\lambda B_6 \rangle \langle u_\nu u_\lambda \rangle$ + H.c.			1340	
$i\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu f_-{}^{\lambda\rho} \sigma_{\nu\lambda} D_{\mu\rho} B_{\bar 3} \rangle$ + H.c.	49		116		$\langle f_+{}^{\mu\nu} \rangle \langle u_\mu u^\lambda \rangle \langle \bar{B}_{\bar 3} \sigma_{\nu\lambda} B_6 \rangle$ + H.c.			1341	
$\langle \bar{B}_{\bar 3} u^\mu \nabla_\mu h^{\nu\lambda} D_{\nu\lambda} B_{\bar 3} \rangle$ + H.c.	50		117		$\langle f_+{}^{\mu\nu} \rangle \langle u^\lambda u_\lambda \rangle \langle \bar{B}_{\bar 3} \sigma_{\mu\nu} B_6 \rangle$ + H.c.			1342	
$\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu h^{\lambda\rho} D_{\mu\nu\lambda\rho} B_{\bar 3} \rangle$ + H.c.	51		118		$\langle f_+{}^{\mu\nu} \rangle \langle u^\lambda u^\rho \rangle \langle \bar{B}_{\bar 3} \sigma_{\mu\nu} D_{\lambda\rho} B_6 \rangle$ + H.c.			1343	
$i\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu h^{\lambda\rho} \sigma_{\mu\nu} D_{\lambda\rho} B_{\bar 3} \rangle$ + H.c.	52		119		$\langle f_+{}^{\mu\nu} \rangle \langle u^\lambda u^\rho \rangle \langle \bar{B}_{\bar 3} \sigma_{\mu\lambda} D_{\nu\rho} B_6 \rangle$ + H.c.			1344	
$\langle \bar{B}_{\bar 3} u^\mu B_{\bar 3} \nabla^\nu f^T_{-\mu\nu} \rangle$	53		120		$i\langle f_+{}^{\mu\nu} u_\mu \rangle \langle \bar{B}_{\bar 3} u_\nu B_6 \rangle$ + H.c.			1345	
$\langle \bar{B}_{\bar 3} u^\mu D_\mu{}^\nu B_{\bar 3} \nabla^\lambda f^T_{-\nu\lambda} \rangle$	54		121		$i\langle f_+{}^{\mu\nu} u_\mu \rangle \langle \bar{B}_{\bar 3} u^\lambda D_{\nu\lambda} B_6 \rangle$ + H.c.			1346	
$\langle \bar{B}_{\bar 3} f_-{}^{\mu\nu} f_{-\mu\nu} B_{\bar 3} \rangle$			122		$i\langle f_+{}^{\mu\nu} u^\lambda \rangle \langle \bar{B}_{\bar 3} u_\mu D_{\nu\lambda} B_6 \rangle$ + H.c.			1347	
$\langle \bar{B}_{\bar 3} f_-{}^{\mu\nu} f_{-\mu}{}^\lambda D_{\nu\lambda} B_{\bar 3} \rangle$			123		$\langle f_+{}^{\mu\nu} u_\mu \rangle \langle \bar{B}_{\bar 3} u^\lambda \sigma_{\nu\lambda} B_6 \rangle$ + H.c.			1348	I
$i\langle \bar{B}_{\bar 3} f_-{}^{\mu\nu} f_{-\mu}{}^\lambda \sigma_{\nu\lambda} B_{\bar 3} \rangle$	55		124		$\langle f_+{}^{\mu\nu} u^\lambda \rangle \langle \bar{B}_{\bar 3} u_\mu \sigma_{\nu\lambda} B_6 \rangle$ + H.c.			1349	I
$i\langle \bar{B}_{\bar 3} f_-{}^{\mu\nu} f_-{}^{\lambda\rho} \sigma_{\mu\lambda} D_{\nu\rho} B_{\bar 3} \rangle$	56		125		$\langle f_+{}^{\mu\nu} u^\lambda \rangle \langle \bar{B}_{\bar 3} u_\lambda \sigma_{\mu\nu} B_6 \rangle$ + H.c.			1350	I
$i\langle \bar{B}_{\bar 3} f_-{}^{\mu\nu} h_\mu{}^\lambda \sigma_{\nu\lambda} B_{\bar 3} \rangle$ + H.c.	57		126		$\langle f_+{}^{\mu\nu} u^\lambda \rangle \langle \bar{B}_{\bar 3} u^\rho \sigma_{\mu\nu} D_{\lambda\rho} B_6 \rangle$ + H.c.			1351	I
$\langle \bar{B}_{\bar 3} f_-{}^{\mu\nu} B_{\bar 3} f^T_{-\mu\nu} \rangle$	58		127		$\langle f_+{}^{\mu\nu} u^\lambda \rangle \langle \bar{B}_{\bar 3} u^\rho \sigma_{\mu\lambda} D_{\nu\rho} B_6 \rangle$ + H.c.			1352	I
$\langle \bar{B}_{\bar 3} f_-{}^{\mu\nu} D_\mu{}^\lambda B_{\bar 3} f^T_{-\nu\lambda} \rangle$	59		128		$\langle f_+{}^{\mu\nu} u^\lambda \rangle \langle \bar{B}_{\bar 3} u^\rho \sigma_{\mu\rho} D_{\nu\lambda} B_6 \rangle$ + H.c.			1353	I
$\langle \bar{B}_{\bar 3} h^{\mu\nu} h_{\mu\nu} B_{\bar 3} \rangle$	60		129		$i\langle \bar{B}_{\bar 3} f_+{}^{\mu\nu} f_{-\mu}{}^\lambda \gamma_5 \gamma_\nu D_\lambda B_6 \rangle$ + H.c.	681	I	1354	I
$i\langle \bar{B}_{\bar 3} h^{\mu\nu} h_\mu{}^\lambda \sigma_{\nu\lambda} B_{\bar 3} \rangle$	61		130		$i\langle \bar{B}_{\bar 3} f_+{}^{\mu\nu} f_{-\mu}{}^\lambda \gamma_5 \gamma_\lambda D_\nu B_6 \rangle$ + H.c.	682	I	1355	I

(Table continued)

TABLE VIII. *(Continued)*

O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$	O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$
$\langle\bar{B}_{\bar{3}}h^{\mu\nu}B_{\bar{3}}h^T_{\mu\nu}\rangle$	62		131		$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}h_\mu{}^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	683	I	1356	I
$\langle\bar{B}_{\bar{3}}B_{\bar{3}}\rangle\langle u^\mu\nabla^\nu f_{-\mu\nu}\rangle$			132		$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}h_\mu{}^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.	684	I	1357	I
$\langle\bar{B}_{\bar{3}}B_{\bar{3}}\rangle\langle h^{\mu\nu}h_{\mu\nu}\rangle$			133		$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}h^{\lambda\rho}\gamma_5\gamma_\mu D_{\nu\lambda\rho}B_6\rangle$ + H.c.	685	I	1358	I
$\langle\bar{B}_{\bar{3}}D^{\mu\nu}B_{\bar{3}}\rangle\langle u_\mu\nabla^\lambda f_{-\nu\lambda}\rangle$			134		$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}\gamma_5\gamma_\mu D^\lambda B_6 f^T_{-\nu\lambda}\rangle$ + H.c.	686	I	1359	I
$\langle\bar{B}_{\bar{3}}D^{\mu\nu}B_{\bar{3}}\rangle\langle u^\lambda\nabla_\mu f_{-\nu\lambda}\rangle$			135		$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}\gamma_5\gamma^\lambda D_\mu B_6 f^T_{-\nu\lambda}\rangle$ + H.c.	687	I	1360	I
$\langle\bar{B}_{\bar{3}}D^{\mu\nu}B_{\bar{3}}\rangle\langle u^\lambda\nabla_\mu h_{\nu\lambda}\rangle$			136		$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}\gamma_5\gamma^\lambda D_\mu B_6 h^T_{\nu\lambda}\rangle$ + H.c.	688	I	1361	I
$\langle\bar{B}_{\bar{3}}D^{\mu\nu\lambda\rho}B_{\bar{3}}\rangle\langle u_\mu\nabla_\nu h_{\lambda\rho}\rangle$			137		$i\langle\bar{B}_{\bar{3}}\nabla^\mu f_{+\mu}{}^\nu u^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	689	I	1362	I
$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u_\mu u_\nu B_{\bar{3}}\rangle$ + H.c.	63		138		$i\langle\bar{B}_{\bar{3}}\nabla^\mu f_{+\mu}{}^\nu u^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.	690	I	1363	I
$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u_\mu u^\lambda D_{\nu\lambda}B_{\bar{3}}\rangle$ + H.c.	64		139		$i\langle\bar{B}_{\bar{3}}\nabla^\mu f_+{}^{\nu\lambda}u_\mu\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	691	I	1364	I
$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u_\mu D_{\nu\lambda}B_{\bar{3}}\rangle$ + H.c.			140		$i\langle\bar{B}_{\bar{3}}\nabla^\mu f_{+\mu}{}^\nu\gamma_5\gamma_\nu D^\lambda B_6 u^T_\lambda\rangle$ + H.c.	692	I	1365	I
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u_\mu u^\lambda\sigma_{\nu\lambda}B_{\bar{3}}\rangle$ + H.c.	65		141		$i\langle\bar{B}_{\bar{3}}\nabla^\mu f_{+\mu}{}^\nu\gamma_5\gamma^\lambda D_\nu B_6 u^T_\lambda\rangle$ + H.c.	693	I	1366	I
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u_\mu\sigma_{\nu\lambda}B_{\bar{3}}\rangle$ + H.c.	66		142		$i\langle\bar{B}_{\bar{3}}\nabla^\mu f_+{}^{\nu\lambda}\gamma_5\gamma_\mu D_\nu B_6 u^T_\lambda\rangle$ + H.c.	694	I	1367	I
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u_\lambda\sigma_{\mu\nu}B_{\bar{3}}\rangle$ + H.c.	67		143		$i\langle\bar{B}_{\bar{3}}u^\mu\nabla_\mu f_+{}^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	695	I	1368	I
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\nu}D_{\lambda\rho}B_{\bar{3}}\rangle$ + H.c.	68		144		$i\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_{+\mu}{}^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	696	I	1369	I
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\lambda}D_{\nu\rho}B_{\bar{3}}\rangle$ + H.c.	69		145		$i\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_{+\nu}{}^\lambda\gamma_5\gamma_\mu D_\lambda B_6\rangle$ + H.c.	697	I	1370	I
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\rho}D_{\nu\lambda}B_{\bar{3}}\rangle$ + H.c.	70		146		$i\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_{+\nu}{}^\lambda\gamma_5\gamma_\lambda D_\mu B_6\rangle$ + H.c.	698	I	1371	I
$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u_\mu B_{\bar{3}}u^T_\nu\rangle$ + H.c.	71		147		$i\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_+{}^{\lambda\rho}\gamma_5\gamma_\lambda D_{\mu\nu\rho}B_6\rangle$ + H.c.	699	I	1372	I
$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u_\mu D_\nu{}^\lambda B_{\bar{3}}u^T_\lambda\rangle$ + H.c.	72		148		$i\langle\bar{B}_{\bar{3}}f_-{}^{\mu\nu}f_{+\mu}{}^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	700	I	1373	I
$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda D_{\mu\lambda}B_{\bar{3}}u^T_\nu\rangle$ + H.c.	73		149		$i\langle\bar{B}_{\bar{3}}f_-{}^{\mu\nu}f_{+\mu}{}^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.	701	I	1374	I
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u_\mu\sigma_\nu{}^\lambda B_{\bar{3}}u^T_\lambda\rangle$ + H.c.	74		150		$i\langle\bar{B}_{\bar{3}}h^{\mu\nu}f_{+\mu}{}^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	702	I	1375	I
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\nu}B_{\bar{3}}u^T_\lambda\rangle$ + H.c.	75		151		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar{3}}f_{-\mu}{}^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	703	I	1376	
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\lambda}B_{\bar{3}}u^T_\nu\rangle$ + H.c.			152		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar{3}}f_{-\mu}{}^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.	704	I	1377	
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\nu}D_\lambda{}^\rho B_{\bar{3}}u^T_\rho\rangle$ + H.c.	76		153		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar{3}}h_\mu{}^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.	705	I	1378	
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\lambda}D_\nu{}^\rho B_{\bar{3}}u^T_\rho\rangle$ + H.c.	77		154		$i\langle f_+{}^{\mu\nu}f_{-\mu}{}^\lambda\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			1379	I
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda\sigma_\mu{}^\rho D_{\nu\lambda}B_{\bar{3}}u^T_\rho\rangle$ + H.c.			155		$i\langle f_+{}^{\mu\nu}f_{-\mu}{}^\lambda\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.			1380	I
$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}B_{\bar{3}}u^T_\mu u^T_\nu\rangle$	78		156		$i\langle f_+{}^{\mu\nu}h_\mu{}^\lambda\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			1381	I
$i\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}D_\mu{}^\lambda B_{\bar{3}}u^T_\nu u^T_\lambda\rangle$ + H.c.	79		157		$i\langle f_+{}^{\mu\nu}h_\mu{}^\lambda\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.			1382	I
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}\sigma_{\mu\nu}B_{\bar{3}}u^{T\lambda}u^T_\lambda\rangle$			158		$i\langle f_+{}^{\mu\nu}h^{\lambda\rho}\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu D_{\nu\lambda\rho}B_6\rangle$ + H.c.			1383	I
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}\sigma_\mu{}^\lambda B_{\bar{3}}u^T_\nu u^T_\lambda\rangle$ + H.c.			159		$i\langle\nabla^\mu f_{+\mu}{}^\nu\rangle\langle\bar{B}_{\bar{3}}u^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	706	I	1384	
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}\sigma_{\mu\nu}D^{\lambda\rho}B_{\bar{3}}u^T_\lambda u^T_\rho\rangle$			160		$i\langle\nabla^\mu f_{+\mu}{}^\nu\rangle\langle\bar{B}_{\bar{3}}u^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.	707	I	1385	
$\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}\sigma_\mu{}^\lambda D_\nu{}^\rho B_{\bar{3}}u^T_\lambda u^T_\rho\rangle$ + H.c.			161		$i\langle\nabla^\mu f_+{}^{\nu\lambda}\rangle\langle\bar{B}_{\bar{3}}u_\mu\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	708	I	1386	
$i\langle\bar{B}_{\bar{3}}u^\mu f_{+\mu}{}^\nu u_\nu B_{\bar{3}}\rangle$	80		162		$i\langle\nabla^\mu f_{+\mu}{}^\nu u^\lambda\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			1387	I
$i\langle\bar{B}_{\bar{3}}u^\mu f_{+\mu}{}^\nu u^\lambda D_{\nu\lambda}B_{\bar{3}}\rangle$ + H.c.	81		163		$i\langle\nabla^\mu f_{+\mu}{}^\nu u^\lambda\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.			1388	I
$\langle\bar{B}_{\bar{3}}u^\mu f_{+\mu}{}^\nu u^\lambda\sigma_{\nu\lambda}B_{\bar{3}}\rangle$ + H.c.	82		164		$i\langle\nabla^\mu f_+{}^{\nu\lambda}u_\mu\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			1389	I
$\langle\bar{B}_{\bar{3}}u^\mu f_+{}^{\nu\lambda}u_\mu\sigma_{\nu\lambda}B_{\bar{3}}\rangle$	83		165		$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}f_{-\lambda\rho}B_6\rangle$ + H.c.	709		1390	
$\langle\bar{B}_{\bar{3}}u^\mu f_+{}^{\nu\lambda}u^\rho\sigma_{\mu\nu}D_{\lambda\rho}B_{\bar{3}}\rangle$	84		166		$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}f_{-\lambda}{}^\sigma D_{\rho\sigma}B_6\rangle$ + H.c.	710		1391	
$\langle\bar{B}_{\bar{3}}u^\mu f_+{}^{\nu\lambda}u^\rho\sigma_{\nu\lambda}D_{\mu\rho}B_{\bar{3}}\rangle$	85		167		$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}h_\lambda{}^\sigma D_{\rho\sigma}B_6\rangle$ + H.c.	711		1392	
$i\langle\bar{B}_{\bar{3}}B_{\bar{3}}\rangle\langle f_+{}^{\mu\nu}u_\mu u_\nu\rangle$			168		$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}B_6 f^T_{-\lambda\rho}\rangle$ + H.c.	712		1393	
$i\langle\bar{B}_{\bar{3}}D^{\mu\nu}B_{\bar{3}}\rangle\langle f_{+\mu}{}^\lambda u_\nu u_\lambda\rangle$ + H.c.			169		$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}D_\lambda{}^\sigma B_6 f^T_{-\rho\sigma}\rangle$ + H.c.	713		1394	
$\langle\bar{B}_{\bar{3}}\sigma^{\mu\nu}B_{\bar{3}}\rangle\langle f_{+\mu\nu}u^\lambda u_\lambda\rangle$	86		170		$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu\nabla_\nu f_{+\lambda}{}^\sigma D_{\rho\sigma}B_6\rangle$ + H.c.	714		1395	
$\langle\bar{B}_{\bar{3}}\sigma^{\mu\nu}B_{\bar{3}}\rangle\langle f_{+\mu}{}^\lambda u_\nu u_\lambda\rangle$ + H.c.	87		171		$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{-\mu\nu}f_{+\lambda\rho}B_6\rangle$ + H.c.	715		1396	
$\langle\bar{B}_{\bar{3}}\sigma^{\mu\nu}D^{\lambda\rho}B_{\bar{3}}\rangle\langle f_{+\mu\nu}u_\lambda u_\rho\rangle$	88		172		$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{-\mu\nu}f_{+\lambda}{}^\sigma D_{\rho\sigma}B_6\rangle$ + H.c.	716		1397	
$\langle\bar{B}_{\bar{3}}\sigma^{\mu\nu}D^{\lambda\rho}B_{\bar{3}}\rangle\langle f_{+\mu\lambda}u_\nu u_\rho\rangle$ + H.c.	89		173		$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}B_6\rangle\langle f_{+\mu\nu}f_{-\lambda\rho}\rangle$ + H.c.	717		1398	
$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar{3}}u_\mu u_\nu B_{\bar{3}}\rangle$			174		$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}D_\mu{}^\sigma B_6\rangle\langle f_{+\nu\lambda}f_{-\rho\sigma}\rangle$ + H.c.	718		1399	
$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar{3}}u_\mu u^\lambda D_{\nu\lambda}B_{\bar{3}}\rangle$ + H.c.			175		$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}D_\mu{}^\sigma B_6\rangle\langle f_{+\nu\lambda}h_{\rho\sigma}\rangle$ + H.c.			1400	

(Table continued)

TABLE VIII. *(Continued)*

O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$	O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} u_\mu u^\lambda \sigma_{\nu\lambda} B_{\bar{3}}\rangle$ + H.c.			176		$i\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}\rangle\langle \bar{B}_{\bar{3}} f_{-\lambda\rho} B_6\rangle$ + H.c.			1401	
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} u^\lambda u_\lambda \sigma_{\mu\nu} B_{\bar{3}}\rangle$			177		$i\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}\rangle\langle \bar{B}_{\bar{3}} f_{-\lambda}{}^\sigma D_{\rho\sigma} B_6\rangle$ + H.c.			1402	
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} u^\lambda u^\rho \sigma_{\mu\nu} D_{\lambda\rho} B_{\bar{3}}\rangle$			178		$\langle \bar{B}_{\bar{3}} \nabla^\mu\nabla_\mu f_+{}^{\nu\lambda}\sigma_{\nu\lambda} B_6\rangle$ + H.c.	719	I	1403	I
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} u^\lambda u^\rho \sigma_{\mu\lambda} D_{\nu\rho} B_{\bar{3}}\rangle$ + H.c.			179		$\langle \nabla^\mu\nabla_\mu f_+{}^{\nu\lambda}\rangle\langle \bar{B}_{\bar{3}} \sigma_{\nu\lambda} B_6\rangle$ + H.c.			1404	
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} u_\mu \sigma_\nu{}^\lambda B_{\bar{3}} u^T_\lambda\rangle$			180		$\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} f_{+\mu\nu} B_6\rangle$ + H.c.	720		1405	
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} u^\lambda \sigma_{\mu\nu} B_{\bar{3}} u^T_\lambda\rangle$			181		$\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} f_{+\mu}{}^\lambda D_{\nu\lambda} B_6\rangle$ + H.c.	721		1406	
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} u^\lambda \sigma_{\mu\nu} D_\lambda{}^\rho B_{\bar{3}} u^T_\rho\rangle$			182		$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} f_{+\mu}{}^\lambda \sigma_{\nu\lambda} B_6\rangle$ + H.c.	722	I	1407	I
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} u^\lambda \sigma_{\mu\lambda} D_\nu{}^\rho B_{\bar{3}} u^T_\rho\rangle$			183		$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} f_+{}^{\lambda\rho} \sigma_{\mu\lambda} D_{\nu\rho} B_6\rangle$ + H.c.	723	I	1408	I
$\langle f_+{}^{\mu\nu}\rangle\langle u_\mu u^\lambda\rangle\langle \bar{B}_{\bar{3}} \sigma_{\nu\lambda} B_{\bar{3}}\rangle$			184		$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} \sigma_\mu{}^\lambda B_6 f^T_{+\nu\lambda}\rangle$ + H.c.	724	I	1409	I
$\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u_\lambda\rangle\langle \bar{B}_{\bar{3}} \sigma_{\mu\nu} B_{\bar{3}}\rangle$			185		$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} \sigma_\mu{}^\lambda D_\nu{}^\rho B_6 f^T_{+\lambda\rho}\rangle$ + H.c.	725	I	1410	I
$\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u^\rho\rangle\langle \bar{B}_{\bar{3}} \sigma_{\mu\nu} D_{\lambda\rho} B_{\bar{3}}\rangle$			186		$\langle \bar{B}_{\bar{3}} B_6\rangle\langle f_+{}^{\mu\nu} f_{+\mu\nu}\rangle$ + H.c.	726		1411	
$\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u^\rho\rangle\langle \bar{B}_{\bar{3}} \sigma_{\mu\lambda} D_{\nu\rho} B_{\bar{3}}\rangle$			187		$\langle \bar{B}_{\bar{3}} D^{\mu\nu} B_6\rangle\langle f_{+\mu}{}^\lambda f_{+\nu\lambda}\rangle$ + H.c.	727		1412	
$\langle f_+{}^{\mu\nu} u_\mu\rangle\langle \bar{B}_{\bar{3}} u^\lambda \sigma_{\nu\lambda} B_{\bar{3}}\rangle$			188		$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} f_{+\mu\nu} B_6\rangle$ + H.c.			1413	
$\langle f_+{}^{\mu\nu} u^\lambda\rangle\langle \bar{B}_{\bar{3}} u_\mu \sigma_{\nu\lambda} B_{\bar{3}}\rangle$			189		$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} f_{+\mu}{}^\lambda D_{\nu\lambda} B_6\rangle$ + H.c.			1414	
$\langle f_+{}^{\mu\nu} u^\lambda\rangle\langle \bar{B}_{\bar{3}} u_\lambda \sigma_{\mu\nu} B_{\bar{3}}\rangle$			190		$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} f_{+\mu}{}^\lambda \sigma_{\nu\lambda} B_6\rangle$ + H.c.	728	I	1415	I
$\langle f_+{}^{\mu\nu} u^\lambda\rangle\langle \bar{B}_{\bar{3}} u^\rho \sigma_{\mu\nu} D_{\lambda\rho} B_{\bar{3}}\rangle$			191		$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} f_+{}^{\lambda\rho} \sigma_{\mu\lambda} D_{\nu\rho} B_6\rangle$ + H.c.	729	I	1416	I
$\langle f_+{}^{\mu\nu} u^\lambda\rangle\langle \bar{B}_{\bar{3}} u^\rho \sigma_{\mu\lambda} D_{\nu\rho} B_{\bar{3}}\rangle$			192		$\langle f_+{}^{\mu\nu}\rangle\langle f_{+\mu\nu}\rangle\langle \bar{B}_{\bar{3}} B_6\rangle$ + H.c.			1417	
$\langle f_+{}^{\mu\nu} u^\lambda\rangle\langle \bar{B}_{\bar{3}} u^\rho \sigma_{\mu\rho} D_{\nu\lambda} B_{\bar{3}}\rangle$			193		$\langle f_+{}^{\mu\nu}\rangle\langle f_{+\mu}{}^\lambda\rangle\langle \bar{B}_{\bar{3}} D_{\nu\lambda} B_6\rangle$ + H.c.			1418	
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} f_{-\mu}{}^\lambda \gamma_5\gamma_\nu D_\lambda B_{\bar{3}}\rangle$ + H.c.	90		194		$\langle \bar{B}_{\bar{3}} u^\mu u_\mu \chi_+ B_6\rangle$ + H.c.	730		1419	
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} f_{-\mu}{}^\lambda \gamma_5\gamma_\lambda D_\nu B_{\bar{3}}\rangle$ + H.c.	91		195		$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \chi_+ D_{\mu\nu} B_6\rangle$ + H.c.	731		1420	
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} h_\mu{}^\lambda \gamma_5\gamma_\nu D_\lambda B_{\bar{3}}\rangle$ + H.c.	92		196		$i\langle \bar{B}_{\bar{3}} u^\mu u^\nu \chi_+ \sigma_{\mu\nu} B_6\rangle$ + H.c.	732	I	1421	I
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} h_\mu{}^\lambda \gamma_5\gamma_\lambda D_\nu B_{\bar{3}}\rangle$ + H.c.	93		197		$\langle \bar{B}_{\bar{3}} u^\mu u_\mu B_6 \chi^T_+\rangle$ + H.c.			1422	
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} h^{\lambda\rho} \gamma_5\gamma_\mu D_{\nu\lambda\rho} B_{\bar{3}}\rangle$ + H.c.	94		198		$\langle \bar{B}_{\bar{3}} u^\mu u^\nu D_{\mu\nu} B_6 \chi^T_+\rangle$ + H.c.			1423	
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma_\mu D^\lambda B_{\bar{3}} f^T_{-\nu\lambda}\rangle$	95		199		$i\langle \bar{B}_{\bar{3}} u^\mu u^\nu \sigma_{\mu\nu} B_6 \chi^T_+\rangle$ + H.c.	733	I	1424	I
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma^\lambda D_\mu B_{\bar{3}} f^T_{-\nu\lambda}\rangle$	96		200		$\langle \bar{B}_{\bar{3}} u^\mu \chi_+ u_\mu B_6\rangle$ + H.c.	734		1425	
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma^\lambda D_\mu B_{\bar{3}} h^T_{\nu\lambda}\rangle$	97		201		$\langle \bar{B}_{\bar{3}} u^\mu \chi_+ u^\nu D_{\mu\nu} B_6\rangle$ + H.c.	735		1426	
$i\langle \bar{B}_{\bar{3}} \nabla^\mu f_{+\mu}{}^\nu u^\lambda \gamma_5\gamma_\nu D_\lambda B_{\bar{3}}\rangle$ + H.c.	98		202		$i\langle \bar{B}_{\bar{3}} u^\mu \chi_+ u^\nu \sigma_{\mu\nu} B_6\rangle$ + H.c.	736	I	1427	I
$i\langle \bar{B}_{\bar{3}} \nabla^\mu f_{+\mu}{}^\nu u^\lambda \gamma_5\gamma_\lambda D_\nu B_{\bar{3}}\rangle$ + H.c.	99		203		$\langle \bar{B}_{\bar{3}} u^\mu \chi_+ B_6 u^T_\mu\rangle$ + H.c.	737		1428	
$i\langle \bar{B}_{\bar{3}} \nabla^\mu f_+{}^{\nu\lambda} u_\mu \gamma_5\gamma_\nu D_\lambda B_{\bar{3}}\rangle$ + H.c.	100		204		$\langle \bar{B}_{\bar{3}} u^\mu \chi_+ D_\mu{}^\nu B_6 u^T_\nu\rangle$ + H.c.	738		1429	
$i\langle \bar{B}_{\bar{3}} \nabla^\mu f_{+\mu}{}^\nu \gamma_5\gamma_\nu D^\lambda B_{\bar{3}} u^T_\lambda\rangle$	101		205		$i\langle \bar{B}_{\bar{3}} u^\mu \chi_+ \sigma_\mu{}^\nu B_6 u^T_\nu\rangle$ + H.c.	739	I	1430	I
$i\langle \bar{B}_{\bar{3}} \nabla^\mu f_{+\mu}{}^\nu \gamma_5\gamma^\lambda D_\nu B_{\bar{3}} u^T_\lambda\rangle$	102		206		$\langle \bar{B}_{\bar{3}} u^\mu B_6 u^T_\mu \chi^T_+\rangle$ + H.c.			1431	
$i\langle \bar{B}_{\bar{3}} \nabla^\mu f_+{}^{\nu\lambda} \gamma_5\gamma_\mu D_\nu B_{\bar{3}} u^T_\lambda\rangle$	103		207		$\langle \bar{B}_{\bar{3}} u^\mu D_\mu{}^\nu B_6 u^T_\nu \chi^T_+\rangle$ + H.c.			1432	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} f_{-\mu}{}^\lambda \gamma_5\gamma_\nu D_\lambda B_{\bar{3}}\rangle$	104		208		$i\langle \bar{B}_{\bar{3}} u^\mu \sigma_\mu{}^\nu B_6 u^T_\nu \chi^T_+\rangle$ + H.c.	740	I	1433	I
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} f_{-\mu}{}^\lambda \gamma_5\gamma_\lambda D_\nu B_{\bar{3}}\rangle$	105		209		$\langle \bar{B}_{\bar{3}} \chi_+ u^\mu u_\mu B_6\rangle$ + H.c.			1434	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} h_\mu{}^\lambda \gamma_5\gamma_\lambda D_\nu B_{\bar{3}}\rangle$	106		210		$\langle \bar{B}_{\bar{3}} \chi_+ u^\mu u^\nu D_{\mu\nu} B_6\rangle$ + H.c.			1435	
$i\langle f_+{}^{\mu\nu} f_{-\mu}{}^\lambda\rangle\langle \bar{B}_{\bar{3}} \gamma_5\gamma_\nu D_\lambda B_{\bar{3}}\rangle$			211		$i\langle \bar{B}_{\bar{3}} \chi_+ u^\mu u^\nu \sigma_{\mu\nu} B_6\rangle$ + H.c.			1436	I
$i\langle f_+{}^{\mu\nu} f_{-\mu}{}^\lambda\rangle\langle \bar{B}_{\bar{3}} \gamma_5\gamma_\lambda D_\nu B_{\bar{3}}\rangle$			212		$\langle \bar{B}_{\bar{3}} B_6\rangle\langle u^\mu u_\mu \chi_+\rangle$ + H.c.			1437	
$i\langle f_+{}^{\mu\nu} h_\mu{}^\lambda\rangle\langle \bar{B}_{\bar{3}} \gamma_5\gamma_\nu D_\lambda B_{\bar{3}}\rangle$			213		$\langle \bar{B}_{\bar{3}} D^{\mu\nu} B_6\rangle\langle u_\mu u_\nu \chi_+\rangle$ + H.c.			1438	
$i\langle f_+{}^{\mu\nu} h_\mu{}^\lambda\rangle\langle \bar{B}_{\bar{3}} \gamma_5\gamma_\lambda D_\nu B_{\bar{3}}\rangle$			214		$i\langle \bar{B}_{\bar{3}} \sigma^{\mu\nu} B_6\rangle\langle u_\mu u_\nu \chi_+\rangle$ + H.c.			1439	I
$i\langle f_+{}^{\mu\nu} h^{\lambda\rho}\rangle\langle \bar{B}_{\bar{3}} \gamma_5\gamma_\mu D_{\nu\lambda\rho} B_{\bar{3}}\rangle$			215		$\langle u^\mu u_\mu\rangle\langle \bar{B}_{\bar{3}} \chi_+ B_6\rangle$ + H.c.			1440	
$i\langle \nabla^\mu f_{+\mu}{}^\nu\rangle\langle \bar{B}_{\bar{3}} u^\lambda \gamma_5\gamma_\nu D_\lambda B_{\bar{3}}\rangle$	107		216		$\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} \chi_+ D_{\mu\nu} B_6\rangle$ + H.c.			1441	
$i\langle \nabla^\mu f_{+\mu}{}^\nu\rangle\langle \bar{B}_{\bar{3}} u^\lambda \gamma_5\gamma_\lambda D_\nu B_{\bar{3}}\rangle$	108		217		$\langle u^\mu \chi_+\rangle\langle \bar{B}_{\bar{3}} u_\mu B_6\rangle$ + H.c.			1442	
$i\langle \nabla^\mu f_+{}^{\nu\lambda}\rangle\langle \bar{B}_{\bar{3}} u_\mu \gamma_5\gamma_\nu D_\lambda B_{\bar{3}}\rangle$	109		218		$\langle u^\mu \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\nu D_{\mu\nu} B_6\rangle$ + H.c.			1443	
$i\langle \nabla^\mu f_{+\mu}{}^\nu u^\lambda\rangle\langle \bar{B}_{\bar{3}} \gamma_5\gamma_\nu D_\lambda B_{\bar{3}}\rangle$			219		$i\langle u^\mu \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\nu \sigma_{\mu\nu} B_6\rangle$ + H.c.			1444	I
$i\langle \nabla^\mu f_{+\mu}{}^\nu u^\lambda\rangle\langle \bar{B}_{\bar{3}} \gamma_5\gamma_\lambda D_\nu B_{\bar{3}}\rangle$			220		$\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\mu u_\mu B_6\rangle$ + H.c.			1445	
$i\langle \nabla^\mu f_+{}^{\nu\lambda} u_\mu\rangle\langle \bar{B}_{\bar{3}} \gamma_5\gamma_\nu D_\lambda B_{\bar{3}}\rangle$			221		$\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\mu u^\nu D_{\mu\nu} B_6\rangle$ + H.c.			1446	
$i\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} f_{+\mu\nu} f_{-\lambda\rho} B_{\bar{3}}\rangle$ + H.c.	110		222		$i\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\mu u^\nu \sigma_{\mu\nu} B_6\rangle$ + H.c.			1447	I

(Table continued)

TABLE VIII. (Continued)

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$ie^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} f_{+\mu\nu} f_{-\lambda}{}^{\sigma} D_{\rho\sigma} B_{\bar{3}}\rangle$ + H.c.	111		223		$i\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\mu \sigma_\mu{}^\nu B_6 u^T{}_\nu\rangle$ + H.c.			1448	I
$ie^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} f_{+\mu\nu} h_{\lambda}{}^{\sigma} D_{\rho\sigma} B_{\bar{3}}\rangle$ + H.c.	112		224		$\langle \bar{B}_{\bar{3}} u^\mu \nabla^\nu \chi_+ \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	741	I	1449	I
$\langle \bar{B}_{\bar{3}} \nabla^\mu \nabla_\mu f_+{}^{\nu\lambda}\sigma_{\nu\lambda}B_{\bar{3}}\rangle$	113		225		$\langle \bar{B}_{\bar{3}} u^\mu \nabla^\nu \chi_+ \gamma_5\gamma_\nu D_\mu B_6\rangle$ + H.c.	742	I	1450	I
$\langle \nabla^\mu \nabla_\mu f_+{}^{\nu\lambda}\rangle\langle \bar{B}_{\bar{3}}\sigma_{\nu\lambda}B_{\bar{3}}\rangle$			226		$\langle \bar{B}_{\bar{3}} u^\mu \gamma_5\gamma^\nu D_\mu B_6 \nabla_\nu\chi_+^T\rangle$ + H.c.	743	I	1451	I
$\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} f_{+\mu\nu} B_{\bar{3}}\rangle$	114		227		$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} \chi_+ \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	744	I	1452	I
$\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} f_{+\mu}{}^{\lambda} D_{\nu\lambda}B_{\bar{3}}\rangle$	115		228		$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} \gamma_5\gamma_\mu D_\nu B_6 \chi_+^T\rangle$ + H.c.	745	I	1453	I
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} f_{+\mu}{}^{\lambda}\sigma_{\nu\lambda}B_{\bar{3}}\rangle$	116		229		$\langle \bar{B}_{\bar{3}} \chi_+ f_-{}^{\mu\nu} \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	746	I	1454	I
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} f_+{}^{\lambda\rho}\sigma_{\mu\lambda}D_{\nu\rho}B_{\bar{3}}\rangle$	117		230		$\langle \bar{B}_{\bar{3}} \chi_+ h^{\mu\nu} \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	747	I	1455	I
$\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} B_{\bar{3}} f_{+\mu\nu}^T\rangle$	118		231		$\langle \bar{B}_{\bar{3}} \nabla^\mu \chi_+ u^\nu \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	748	I	1456	I
$\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} D_\mu{}^{\lambda} B_{\bar{3}} f_{+\nu\lambda}^T\rangle$	119		232		$\langle u^\mu \nabla^\nu \chi_+\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.			1457	I
$\langle \bar{B}_{\bar{3}} B_{\bar{3}}\rangle\langle f_+{}^{\mu\nu} f_{+\mu\nu}\rangle$	120		233		$\langle u^\mu \nabla^\nu \chi_+\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\nu D_\mu B_6\rangle$ + H.c.	749	I	1458	I
$\langle \bar{B}_{\bar{3}} D^{\mu\nu} B_{\bar{3}}\rangle\langle f_{+\mu}{}^{\lambda} f_{+\nu\lambda}\rangle$	121		234		$\langle f_-{}^{\mu\nu} \chi_+\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	750	I	1459	I
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} f_{+\mu\nu} B_{\bar{3}}\rangle$			235		$\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.			1460	I
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} f_{+\mu}{}^{\lambda} D_{\nu\lambda}B_{\bar{3}}\rangle$			236		$\langle \nabla^\mu \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\nu \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.			1461	I
$\langle f_+{}^{\mu\nu}\rangle\langle f_{+\mu\nu}\rangle\langle \bar{B}_{\bar{3}} B_{\bar{3}}\rangle$			237		$\langle \bar{B}_{\bar{3}} \nabla^\mu \nabla_\mu \chi_+ B_6\rangle$ + H.c.	751		1462	
$\langle f_+{}^{\mu\nu}\rangle\langle f_{+\mu}{}^{\lambda}\rangle\langle \bar{B}_{\bar{3}} D_{\nu\lambda}B_{\bar{3}}\rangle$			238		$\langle \nabla^\mu \nabla_\mu \chi_+\rangle\langle \bar{B}_{\bar{3}} B_6\rangle$ + H.c.	752		1463	
$\langle \bar{B}_{\bar{3}} u^\mu u_\mu \chi_+ B_{\bar{3}}\rangle$ + H.c.	122		239		$\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} \chi_+ \sigma_{\mu\nu} B_6\rangle$ + H.c.	753	I	1464	I
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \chi_+ D_{\mu\nu} B_{\bar{3}}\rangle$ + H.c.	123		240		$\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} \sigma_{\mu\nu} B_6 \chi_+^T\rangle$ + H.c.	754	I	1465	I
$i\langle \bar{B}_{\bar{3}} u^\mu u^\nu \chi_+ \sigma_{\mu\nu} B_{\bar{3}}\rangle$ + H.c.	124		241		$\langle \bar{B}_{\bar{3}} \chi_+ f_+{}^{\mu\nu} \sigma_{\mu\nu} B_6\rangle$ + H.c.	755	I	1466	I
$\langle \bar{B}_{\bar{3}} u^\mu u_\mu B_{\bar{3}}\chi_+^T\rangle$			242		$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}} \chi_+ \sigma_{\mu\nu} B_6\rangle$ + H.c.	756	I	1467	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu D_{\mu\nu} B_{\bar{3}}\chi_+^T\rangle$			243		$\langle f_+{}^{\mu\nu}\rangle\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} \sigma_{\mu\nu} B_6\rangle$ + H.c.	757	I	1468	
$i\langle \bar{B}_{\bar{3}} u^\mu u^\nu \sigma_{\mu\nu} B_{\bar{3}}\chi_+^T\rangle$	125		244		$\langle f_+{}^{\mu\nu} \chi_+\rangle\langle \bar{B}_{\bar{3}} \sigma_{\mu\nu} B_6\rangle$ + H.c.	758	I	1469	I
$\langle \bar{B}_{\bar{3}} u^\mu \chi_+ u_\mu B_{\bar{3}}\rangle$	126		245		$\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} \sigma_{\mu\nu} B_6\rangle$ + H.c.			1470	I
$\langle \bar{B}_{\bar{3}} u^\mu \chi_+ u^\nu D_{\mu\nu} B_{\bar{3}}\rangle$	127		246		$\langle \bar{B}_{\bar{3}} \chi_+^2 B_6\rangle$ + H.c.	759		1471	
$i\langle \bar{B}_{\bar{3}} u^\mu \chi_+ u^\nu \sigma_{\mu\nu} B_{\bar{3}}\rangle$	128		247		$\langle \bar{B}_{\bar{3}} B_6\rangle\langle \chi_+^2\rangle$ + H.c.	760		1472	
$\langle \bar{B}_{\bar{3}} u^\mu \chi_+ B_{\bar{3}} u^T{}_\mu\rangle$ + H.c.	129		248		$\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} \chi_+ B_6\rangle$ + H.c.			1473	
$\langle \bar{B}_{\bar{3}} u^\mu \chi_+ D_\mu{}^\nu B_{\bar{3}} u^T{}_\nu\rangle$ + H.c.	130		249		$\langle \chi_+\rangle\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} B_6\rangle$ + H.c.			1474	
$i\langle \bar{B}_{\bar{3}} u^\mu \chi_+ \sigma_\mu{}^\nu B_{\bar{3}} u^T{}_\nu\rangle$ + H.c.	131		250		$i\langle \bar{B}_{\bar{3}} u^\mu u^\nu \chi_- \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	761	I	1475	I
$\langle \bar{B}_{\bar{3}} B_{\bar{3}}\rangle\langle u^\mu u_\mu \chi_+\rangle$	132		251		$i\langle \bar{B}_{\bar{3}} u^\mu u^\nu \chi_- \gamma_5\gamma_\nu D_\mu B_6\rangle$ + H.c.	762	I	1476	I
$\langle \bar{B}_{\bar{3}} D^{\mu\nu} B_{\bar{3}}\rangle\langle u_\mu u_\nu \chi_+\rangle$	133		252		$i\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5\gamma_\mu D_\nu B_6 \chi_-^T\rangle$ + H.c.	763	I	1477	I
$i\langle \bar{B}_{\bar{3}} \sigma^{\mu\nu} B_{\bar{3}}\rangle\langle u_\mu u_\nu \chi_+\rangle$			253		$i\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5\gamma_\nu D_\mu B_6 \chi_-^T\rangle$ + H.c.			1478	I
$\langle u^\mu u_\mu\rangle\langle \bar{B}_{\bar{3}} \chi_+ B_{\bar{3}}\rangle$			254		$i\langle \bar{B}_{\bar{3}} u^\mu \chi_- u^\nu \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	764	I	1479	I
$\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} \chi_+ D_{\mu\nu} B_{\bar{3}}\rangle$			255		$i\langle \bar{B}_{\bar{3}} u^\mu \chi_- u^\nu \gamma_5\gamma_\nu D_\mu B_6\rangle$ + H.c.	765	I	1480	I
$\langle u^\mu \chi_+\rangle\langle \bar{B}_{\bar{3}} u_\mu B_{\bar{3}}\rangle$			256		$i\langle \bar{B}_{\bar{3}} u^\mu \chi_- \gamma_5\gamma_\mu D^\nu B_6 u^T{}_\nu\rangle$ + H.c.	766	I	1481	I
$\langle u^\mu \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\nu D_{\mu\nu} B_{\bar{3}}\rangle$			257		$i\langle \bar{B}_{\bar{3}} u^\mu \chi_- \gamma_5\gamma^\nu D_\mu B_6 u^T{}_\nu\rangle$ + H.c.	767	I	1482	I
$\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\mu u_\mu B_{\bar{3}}\rangle$			258		$i\langle \bar{B}_{\bar{3}} u^\mu \gamma_5\gamma_\mu D^\nu B_6 u^T{}_\nu \chi_-^T\rangle$ + H.c.	768	I	1483	I
$\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\mu u^\nu D_{\mu\nu} B_{\bar{3}}\rangle$			259		$i\langle \bar{B}_{\bar{3}} u^\mu \gamma_5\gamma^\nu D_\mu B_6 u^T{}_\nu \chi_-^T\rangle$ + H.c.			1484	I
$i\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\mu u^\nu \sigma_{\mu\nu} B_{\bar{3}}\rangle$			260		$i\langle \bar{B}_{\bar{3}} \chi_- u^\mu u^\nu \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.			1485	I
$\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\mu B_{\bar{3}} u^T{}_\mu\rangle$			261		$i\langle \bar{B}_{\bar{3}} \chi_- u^\mu u^\nu \gamma_5\gamma_\nu D_\mu B_6\rangle$ + H.c.			1486	I
$\langle \chi_+\rangle\langle \bar{B}_{\bar{3}} u^\mu D_\mu{}^\nu B_{\bar{3}} u^T{}_\nu\rangle$			262		$i\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^\nu B_6\rangle\langle u_\mu u_\nu \chi_-\rangle$ + H.c.			1487	I
$\langle \bar{B}_{\bar{3}} u^\mu \nabla^\nu \chi_+ \gamma_5\gamma_\mu D_\nu B_{\bar{3}}\rangle$ + H.c.	134		263		$i\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^\nu B_6\rangle\langle u_\nu u_\mu \chi_-\rangle$ + H.c.			1488	I
$\langle \bar{B}_{\bar{3}} u^\mu \nabla^\nu \chi_+ \gamma_5\gamma_\nu D_\mu B_{\bar{3}}\rangle$ + H.c.	135		264		$i\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} \chi_- \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.			1489	I
$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} \chi_+ \gamma_5\gamma_\mu D_\nu B_{\bar{3}}\rangle$ + H.c.	136		265		$i\langle u^\mu \chi_-\rangle\langle \bar{B}_{\bar{3}} u^\nu \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.			1490	I
$\langle \bar{B}_{\bar{3}} \nabla^\mu \nabla_\mu \chi_+ B_{\bar{3}}\rangle$	137		266		$i\langle u^\mu \chi_-\rangle\langle \bar{B}_{\bar{3}} u^\nu \gamma_5\gamma_\nu D_\mu B_6\rangle$ + H.c.			1491	I

(Table continued)

TABLE VIII. (Continued)

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$\langle\nabla^\mu\nabla_\mu\chi_+\rangle\langle\bar{B}_{\bar{3}}B_{\bar{3}}\rangle$	138		267		$i\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}u^\mu u^\nu\gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.			1492	I
$\langle\bar{B}_{\bar{3}}f_+^{\mu\nu}\chi_+\sigma_{\mu\nu}B_{\bar{3}}\rangle$ + H.c.	139		268		$i\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}u^\mu u^\nu\gamma_5\gamma_\nu D_\mu B_6\rangle$ + H.c.			1493	I
$\langle\bar{B}_{\bar{3}}f_+^{\mu\nu}\sigma_{\mu\nu}B_{\bar{3}}\chi_+^T\rangle$	140		269		$i\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}u^\mu\gamma_5\gamma_\mu D^\nu B_6 u^T_\nu\rangle$ + H.c.			1494	I
$\langle f_+^{\mu\nu}\rangle\langle\bar{B}_{\bar{3}}\chi_+\sigma_{\mu\nu}B_{\bar{3}}\rangle$	141		270		$i\langle\bar{B}_{\bar{3}}u^\mu\nabla_\mu\chi_-B_6\rangle$ + H.c.	769		1495	
$\langle f_+^{\mu\nu}\rangle\langle\chi_+\rangle\langle\bar{B}_{\bar{3}}\sigma_{\mu\nu}B_{\bar{3}}\rangle$	142		271		$i\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu\chi_-D_{\mu\nu}B_6\rangle$ + H.c.	770		1496	
$\langle f_+^{\mu\nu}\chi_+\rangle\langle\bar{B}_{\bar{3}}\sigma_{\mu\nu}B_{\bar{3}}\rangle$	143		272		$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu\chi_-\sigma_{\mu\nu}B_6\rangle$ + H.c.	771	I	1497	I
$\langle\chi_+\rangle\langle\bar{B}_{\bar{3}}f_+^{\mu\nu}\sigma_{\mu\nu}B_{\bar{3}}\rangle$			273		$i\langle\bar{B}_{\bar{3}}u^\mu B_6\nabla_\mu\chi_-^T\rangle$ + H.c.	772		1498	
$\langle\bar{B}_{\bar{3}}\chi_+^2B_{\bar{3}}\rangle$	144		274		$\langle\bar{B}_{\bar{3}}u^\mu\sigma_\mu^{\ \nu}B_6\nabla_\nu\chi_-^T\rangle$ + H.c.	773	I	1499	I
$\langle\bar{B}_{\bar{3}}\chi_+B_{\bar{3}}\chi_+^T\rangle$	145		275		$\langle\bar{B}_{\bar{3}}f_-^{\ \mu\nu}\chi_-\sigma_{\mu\nu}B_6\rangle$ + H.c.	774	I	1500	I
$\langle\bar{B}_{\bar{3}}B_{\bar{3}}\rangle\langle\chi_+^2\rangle$	146		276		$\langle\bar{B}_{\bar{3}}f_-^{\ \mu\nu}\sigma_{\mu\nu}B_6\chi_-^T\rangle$ + H.c.	775	I	1501	I
$\langle\chi_+\rangle\langle\bar{B}_{\bar{3}}\chi_+B_{\bar{3}}\rangle$			277		$\langle\bar{B}_{\bar{3}}\chi_-f_-^{\ \mu\nu}\sigma_{\mu\nu}B_6\rangle$ + H.c.	776	I	1502	I
$\langle\chi_+\rangle\langle\chi_+\rangle\langle\bar{B}_{\bar{3}}B_{\bar{3}}\rangle$			278		$i\langle\bar{B}_{\bar{3}}\chi_-h^{\mu\nu}D_\mu B_6\rangle$ + H.c.	777		1503	
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu\chi_-\gamma_5\gamma_\mu D_\nu B_{\bar{3}}\rangle$ + H.c.	147		279		$i\langle\bar{B}_{\bar{3}}\nabla^\mu\chi_-u_\mu B_6\rangle$ + H.c.	778		1504	
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu\chi_-\gamma_5\gamma_\nu D_\mu B_{\bar{3}}\rangle$ + H.c.			280		$\langle\bar{B}_{\bar{3}}\nabla^\mu\chi_-u^\nu\sigma_{\mu\nu}B_6\rangle$ + H.c.	779	I	1505	I
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu\gamma_5\gamma_\mu D_\nu B_{\bar{3}}\chi_-^T\rangle$ + H.c.	148		281		$i\langle\bar{B}_{\bar{3}}B_6\rangle\langle u^\mu\nabla_\mu\chi_-\rangle$ + H.c.	780		1506	
$i\langle\bar{B}_{\bar{3}}u^\mu\chi_-u^\nu\gamma_5\gamma_\mu D_\nu B_{\bar{3}}\rangle$ + H.c.	149		282		$i\langle\bar{B}_{\bar{3}}D^{\mu\nu}B_6\rangle\langle u_\mu\nabla_\nu\chi_-\rangle$ + H.c.			1507	
$i\langle\bar{B}_{\bar{3}}u^\mu\chi_-\gamma_5\gamma_\mu D^\nu B_{\bar{3}}u^T_\nu\rangle$ + H.c.	150		283		$\langle u^\mu\nabla^\nu\chi_-\rangle\langle\bar{B}_{\bar{3}}\sigma_{\mu\nu}B_6\rangle$ + H.c.	781	I	1508	I
$i\langle\bar{B}_{\bar{3}}u^\mu\chi_-\gamma_5\gamma^\nu D_\mu B_{\bar{3}}u^T_\nu\rangle$ + H.c.	151		284		$\langle f_-^{\ \mu\nu}\chi_-\rangle\langle\bar{B}_{\bar{3}}\sigma_{\mu\nu}B_6\rangle$ + H.c.	782	I	1509	I
$i\langle\bar{B}_{\bar{3}}\gamma_5\gamma^\mu D^\nu B_{\bar{3}}\rangle\langle u_\mu u_\nu\chi_-\rangle$ + H.c.			285		$\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}f_-^{\ \mu\nu}\sigma_{\mu\nu}B_6\rangle$ + H.c.			1510	I
$i\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}u^\mu u^\nu\gamma_5\gamma_\mu D_\nu B_{\bar{3}}\rangle$ + H.c.			286		$i\langle\nabla^\mu\chi_-\rangle\langle\bar{B}_{\bar{3}}u_\mu B_6\rangle$ + H.c.			1511	
$i\langle\bar{B}_{\bar{3}}u^\mu\nabla_\mu\chi_-B_{\bar{3}}\rangle$ + H.c.	152		287		$\langle\nabla^\mu\chi_-\rangle\langle\bar{B}_{\bar{3}}u^\nu\sigma_{\mu\nu}B_6\rangle$ + H.c.			1512	I
$i\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu\chi_-D_\mu B_{\bar{3}}\rangle$ + H.c.	153		288		$\langle\bar{B}_{\bar{3}}f_+^{\mu\nu}\chi_-\gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	783	I	1513	I
$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu\chi_-\sigma_{\mu\nu}B_{\bar{3}}\rangle$ + H.c.	154		289		$\langle\bar{B}_{\bar{3}}f_+^{\mu\nu}\gamma_5\gamma_\mu D_\nu B_6\chi_-^T\rangle$ + H.c.	784	I	1514	I
$i\langle\bar{B}_{\bar{3}}u^\mu B_{\bar{3}}\nabla_\mu\chi_-^T\rangle$	155		290		$\langle\bar{B}_{\bar{3}}\chi_-f_+^{\mu\nu}\gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	785	I	1515	I
$\langle\bar{B}_{\bar{3}}f_-^{\ \mu\nu}\chi_-\sigma_{\mu\nu}B_{\bar{3}}\rangle$ + H.c.	156		291		$\langle f_+^{\mu\nu}\rangle\langle\bar{B}_{\bar{3}}\chi_-\gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	786	I	1516	I
$i\langle\bar{B}_{\bar{3}}B_{\bar{3}}\rangle\langle u^\mu\nabla_\mu\chi_-\rangle$	157		292		$\langle f_+^{\mu\nu}\rangle\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	787	I	1517	I
$i\langle\bar{B}_{\bar{3}}D^{\mu\nu}B_{\bar{3}}\rangle\langle u_\mu\nabla_\nu\chi_-\rangle$			293		$\langle f_+^{\mu\nu}\chi_-\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	788	I	1518	I
$i\langle\nabla^\mu\chi_-\rangle\langle\bar{B}_{\bar{3}}u_\mu B_{\bar{3}}\rangle$			294		$\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}f_+^{\mu\nu}\gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.			1519	I
$\langle\bar{B}_{\bar{3}}f_+^{\mu\nu}\chi_-\gamma_5\gamma_\mu D_\nu B_{\bar{3}}\rangle$ + H.c.	158		295		$\langle\bar{B}_{\bar{3}}\chi_-^2B_6\rangle$ + H.c.	789		1520	
$\langle\bar{B}_{\bar{3}}f_+^{\mu\nu}\gamma_5\gamma_\mu D_\nu B_{\bar{3}}\chi_-^T\rangle$	159		296		$\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}\chi_-B_6\rangle$ + H.c.			1521	
$\langle f_+^{\mu\nu}\rangle\langle\bar{B}_{\bar{3}}\chi_-\gamma_5\gamma_\mu D_\nu B_{\bar{3}}\rangle$	160		297		$\langle D^\mu D_\mu F_L^{\ \nu\lambda}\rangle\langle\bar{B}_{\bar{3}}\sigma_{\nu\lambda}B_6\rangle$ + P.C.H.	790	I		
$\langle f_+^{\mu\nu}\rangle\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu D_\nu B_{\bar{3}}\rangle$	161		298		$\langle\bar{B}_{\bar{3}}B_6\rangle\langle F_L^{\mu\nu}F_{L\mu\nu}\rangle$ + P.C.H.	791		1522	
$\langle f_+^{\mu\nu}\chi_-\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu D_\nu B_{\bar{3}}\rangle$	162		299		$\langle\bar{B}_{\bar{3}}D^{\mu\nu}B_6\rangle\langle F_{L\mu}^{\ \lambda}F_{L\nu\lambda}\rangle$ + P.C.H.	792		1523	
$\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}f_+^{\mu\nu}\gamma_5\gamma_\mu D_\nu B_{\bar{3}}\rangle$			300		$\langle F_L^{\mu\nu}\rangle\langle F_{L\mu\nu}\rangle\langle\bar{B}_{\bar{3}}B_6\rangle$ + P.C.H.	793			
$\langle\bar{B}_{\bar{3}}\chi_-^2B_{\bar{3}}\rangle$	163		301		$\langle F_L^{\mu\nu}\rangle\langle F_{L\mu}^{\ \lambda}\rangle\langle\bar{B}_{\bar{3}}D_{\nu\lambda}B_6\rangle$ + P.C.H.	794			
$\langle\bar{B}_{\bar{3}}\chi_-B_{\bar{3}}\chi_-^T\rangle$	164		302		$\langle\bar{B}_{\bar{3}}B_6\rangle\langle\chi\chi^\dagger\rangle$ + H.c.	795		1524	
$\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}\chi_-B_{\bar{3}}\rangle$	165		303		$\langle\bar{B}_{\bar{3}}\det\chi B_6\rangle$ + H.c.	796			
$\langle\chi_-\rangle\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}B_{\bar{3}}\rangle$			304		$\langle\bar{B}_{\bar{3}}u^\mu u_\mu u^\nu u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	797		1525	
$\langle D^\mu D_\mu F_L^{\ \nu\lambda}\rangle\langle\bar{B}_{\bar{3}}\sigma_{\nu\lambda}B_{\bar{3}}\rangle$ + P.	166				$\langle\bar{B}_{\bar{3}}u^\mu u_\mu u^\nu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			1526	
$\langle\bar{B}_{\bar{3}}B_{\bar{3}}\rangle\langle F_L^{\mu\nu}F_{L\mu\nu}\rangle$ + P.	167		305		$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u_\mu u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	798		1527	
$\langle\bar{B}_{\bar{3}}D^{\mu\nu}B_{\bar{3}}\rangle\langle F_{L\mu}^{\ \lambda}F_{L\nu\lambda}\rangle$ + P.	168		306		$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u_\mu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	799		1528	
$\langle F_L^{\mu\nu}\rangle\langle F_{L\mu\nu}\rangle\langle\bar{B}_{\bar{3}}B_{\bar{3}}\rangle$ + P.	169				$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u_\nu u^\lambda\gamma_5\gamma_\mu B_{6\lambda}^*\rangle$ + H.c.			1529	
$\langle F_L^{\mu\nu}\rangle\langle F_{L\mu}^{\ \lambda}\rangle\langle\bar{B}_{\bar{3}}D_{\nu\lambda}B_{\bar{3}}\rangle$ + P.	170				$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u_\nu u^\lambda\gamma_5\gamma_\lambda B_{6\mu}^*\rangle$ + H.c.			1530	
$\langle\bar{B}_{\bar{3}}B_{\bar{3}}\rangle\langle\chi\chi^\dagger\rangle$	171		307		$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u^\lambda u_\mu\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			1531	
$\langle\bar{B}_{\bar{3}}\det\chi B_{\bar{3}}\rangle$ + H.c.	172				$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u^\lambda u_\mu\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1532	
$\langle\bar{B}_6 u^\mu u_\mu u^\nu u_\nu B_6\rangle$	173	I	308	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u^\lambda u_\nu\gamma_5\gamma_\mu B_{6\lambda}^*\rangle$ + H.c.			1533	

(Table continued)

TABLE VIII. *(Continued)*

O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$	O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$
$\langle\bar{B}_6 u^\mu u^\nu u_\mu u_\nu B_6\rangle$	174	I	309	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u_\nu \gamma_5 \gamma_\lambda B_{6\mu}^*\rangle$ + H.c.			1534	
$\langle\bar{B}_6 u^\mu u^\nu u_\nu u_\mu B_6\rangle$			310	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u_\lambda \gamma_5 \gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1535	
$\langle\bar{B}_6 u^\mu u_\mu u^\nu u^\lambda D_{\nu\lambda} B_6\rangle$ + H.c.	175	I	311	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u_\lambda \gamma_5 \gamma_\nu B_{6\mu}^*\rangle$ + H.c.			1536	
$\langle\bar{B}_6 u^\mu u^\nu u_\mu u^\lambda D_{\nu\lambda} B_6\rangle$ + H.c.	176	I	312	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u^\rho \gamma_5 \gamma_\mu D_{\nu\lambda} B_{6\rho}^*\rangle$ + H.c.	800		1537	
$\langle\bar{B}_6 u^\mu u^\nu u_\nu u^\lambda D_{\mu\lambda} B_6\rangle$			313	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u^\rho \gamma_5 \gamma_\mu D_{\nu\rho} B_{6\lambda}^*\rangle$ + H.c.	801		1538	
$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u_\mu D_{\nu\lambda} B_6\rangle$			314	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u^\rho \gamma_5 \gamma_\mu D_{\lambda\rho} B_{6\nu}^*\rangle$ + H.c.			1539	
$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u^\rho D_{\mu\nu\lambda\rho} B_6\rangle$	177	I	315	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u^\rho \gamma_5 \gamma_\nu D_{\mu\lambda} B_{6\rho}^*\rangle$ + H.c.	802		1540	
$i\langle\bar{B}_6 u^\mu u_\mu u^\nu u^\lambda \sigma_{\nu\lambda} B_6\rangle$ + H.c.	178	I	316	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u^\rho \gamma_5 \gamma_\nu D_{\mu\rho} B_{6\lambda}^*\rangle$ + H.c.			1541	
$i\langle\bar{B}_6 u^\mu u^\nu u_\mu u^\lambda \sigma_{\nu\lambda} B_6\rangle$ + H.c.	179	I	317	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u^\rho \gamma_5 \gamma_\nu D_{\lambda\rho} B_{6\mu}^*\rangle$ + H.c.			1542	
$i\langle\bar{B}_6 u^\mu u^\nu u_\nu u^\lambda \sigma_{\mu\lambda} B_6\rangle$			318	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u^\rho \gamma_5 \gamma_\lambda D_{\mu\nu} B_{6\rho}^*\rangle$ + H.c.			1543	
$i\langle\bar{B}_6 u^\mu u^\nu u^\lambda u_\mu \sigma_{\nu\lambda} B_6\rangle$			319	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u^\rho \gamma_5 \gamma_\lambda D_{\mu\rho} B_{6\nu}^*\rangle$ + H.c.			1544	
$i\langle\bar{B}_6 u^\mu u^\nu u^\lambda u^\rho \sigma_{\mu\nu} D_{\lambda\mu} B_6\rangle$ + H.c.	180	I	320	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u^\rho \gamma_5 \gamma_\lambda D_{\nu\rho} B_{6\mu}^*\rangle$ + H.c.			1545	
$i\langle\bar{B}_6 u^\mu u^\nu u^\lambda u^\rho \sigma_{\mu\lambda} D_{\nu\rho} B_6\rangle$ + H.c.	181	I	321	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u^\rho \gamma_5 \gamma_\rho D_{\mu\nu} B_{6\lambda}^*\rangle$ + H.c.			1546	
$i\langle\bar{B}_6 u^\mu u^\nu u^\lambda u^\rho \sigma_{\mu\rho} D_{\nu\lambda} B_6\rangle$			322	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u^\rho \gamma_5 \gamma_\rho D_{\mu\lambda} B_{6\nu}^*\rangle$ + H.c.			1547	
$i\langle\bar{B}_6 u^\mu u^\nu u^\lambda u^\rho \sigma_{\nu\lambda} D_{\mu\rho} B_6\rangle$			323	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda u^\rho \gamma_5 \gamma_\rho D_{\nu\lambda} B_{6\mu}^*\rangle$ + H.c.			1548	
$\langle\bar{B}_6 u^\mu u_\mu u^\nu B_6 u^T_\nu\rangle$ + H.c.	182	I	324	I	$\langle\bar{B}_{\bar{3}} u^\mu u_\mu u^\nu \gamma_5 \gamma_\nu B_6^{*\lambda} u^T_\lambda\rangle$ + H.c.	803		1549	
$\langle\bar{B}_6 u^\mu u^\nu u_\mu B_6 u^T_\nu\rangle$	183	I	325	I	$\langle\bar{B}_{\bar{3}} u^\mu u_\mu u^\nu \gamma_5 \gamma^\lambda B_{6\nu}^* u^T_\lambda\rangle$ + H.c.			1550	
$\langle\bar{B}_6 u^\mu u_\mu u^\nu D_\nu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.	184	I	326	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u_\mu \gamma_5 \gamma_\nu B_6^{*\lambda} u^T_\lambda\rangle$ + H.c.	804		1551	
$\langle\bar{B}_6 u^\mu u^\nu u_\mu D_\nu{}^\lambda B_6 u^T_\lambda\rangle$	185	I	327	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u_\mu \gamma_5 \gamma^\lambda B_{6\nu}^* u^T_\lambda\rangle$ + H.c.	805		1552	
$\langle\bar{B}_6 u^\mu u^\nu u^\lambda D_{\mu\nu} B_6 u^T_\lambda\rangle$ + H.c.	186	I	328	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u_\nu \gamma_5 \gamma_\mu B_6^{*\lambda} u^T_\lambda\rangle$ + H.c.			1553	
$\langle\bar{B}_6 u^\mu u^\nu u^\lambda D_{\mu\lambda} B_6 u^T_\nu\rangle$			329	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u_\nu \gamma_5 \gamma^\lambda B_{6\mu}^* u^T_\lambda\rangle$ + H.c.			1554	
$\langle\bar{B}_6 u^\mu u^\nu u^\lambda D_{\mu\nu\lambda}{}^\rho B_6 u^T_\rho\rangle$	187	I	330	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\mu B_{6\nu}^* u^T_\lambda\rangle$ + H.c.			1555	
$i\langle\bar{B}_6 u^\mu u_\mu u^\nu \sigma_\nu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.			331	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\mu B_{6\lambda}^* u^T_\nu\rangle$ + H.c.			1556	
$i\langle\bar{B}_6 u^\mu u^\nu u^\lambda \sigma_{\mu\nu} B_6 u^T_\lambda\rangle$ + H.c.			332	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\nu B_{6\mu}^* u^T_\lambda\rangle$ + H.c.			1557	
$i\langle\bar{B}_6 u^\mu u^\nu u^\lambda \sigma_{\mu\lambda} B_6 u^T_\nu\rangle$			333	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\nu B_{6\lambda}^* u^T_\mu\rangle$ + H.c.			1558	
$i\langle\bar{B}_6 u^\mu u^\nu u^\lambda \sigma_{\mu\nu} D_\lambda{}^\rho B_6 u^T_\rho\rangle$ + H.c.			334	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\lambda B_{6\mu}^* u^T_\nu\rangle$ + H.c.			1559	
$i\langle\bar{B}_6 u^\mu u^\nu u^\lambda \sigma_{\mu\lambda} D_\nu{}^\rho B_6 u^T_\rho\rangle$			335	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\lambda B_{6\nu}^* u^T_\mu\rangle$ + H.c.			1560	
$i\langle\bar{B}_6 u^\mu u^\nu u^\lambda \sigma_\mu{}^\rho D_{\nu\lambda} B_6 u^T_\rho\rangle$ + H.c.			336	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\mu D_{\nu\lambda} B_6^{*\rho} u^T_\rho\rangle$ + H.c.	806		1561	
$\langle\bar{B}_6 u^\mu u_\mu B_6 u^{T\nu} u^T_\nu\rangle$			337	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\mu D_\nu{}^\rho B_{6\lambda}^* u^T_\rho\rangle$ + H.c.	807		1562	
$\langle\bar{B}_6 u^\mu u^\nu B_6 u^T_\mu u^T_\nu\rangle$	188	I	338	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\mu D_\lambda{}^\rho B_{6\nu}^* u^T_\rho\rangle$ + H.c.	808		1563	
$\langle\bar{B}_6 u^\mu u^\nu B_6 u^T_\nu u^T_\mu\rangle$			339	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\nu D_{\mu\lambda} B_6^{*\rho} u^T_\rho\rangle$ + H.c.			1564	
$\langle\bar{B}_6 u^\mu u_\mu D^{\nu\lambda} B_6 u^T_\nu u^T_\lambda\rangle$			340	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\nu D_\mu{}^\rho B_{6\lambda}^* u^T_\rho\rangle$ + H.c.			1565	
$\langle\bar{B}_6 u^\mu u^\nu D_\mu{}^\lambda B_6 u^T_\nu u^T_\lambda\rangle$ + H.c.	189	I	341	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\nu D_\lambda{}^\rho B_{6\mu}^* u^T_\rho\rangle$ + H.c.			1566	
$\langle\bar{B}_6 u^\mu u^\nu D_\mu{}^\lambda B_6 u^T_\lambda u^T_\nu\rangle$ + H.c.			342	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\lambda D_{\mu\nu} B_6^{*\rho} u^T_\rho\rangle$ + H.c.			1567	
$\langle\bar{B}_6 u^\mu u^\nu D_{\mu\nu}{}^{\lambda\rho} B_6 u^T_\lambda u^T_\rho\rangle$			343	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\lambda D_\mu{}^\rho B_{6\nu}^* u^T_\rho\rangle$ + H.c.			1568	
$i\langle\bar{B}_6 u^\mu u_\mu \sigma^{\nu\lambda} B_6 u^T_\nu u^T_\lambda\rangle$			344	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma_\lambda D_\nu{}^\rho B_{6\mu}^* u^T_\rho\rangle$ + H.c.			1569	
$i\langle\bar{B}_6 u^\mu u^\nu \sigma_\mu{}^\lambda B_6 u^T_\lambda u^T_\nu\rangle$ + H.c.			345	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma^\rho D_{\mu\nu} B_{6\lambda}^* u^T_\rho\rangle$ + H.c.			1570	
$i\langle\bar{B}_6 u^\mu u^\nu \sigma_{\mu\nu} D^{\lambda\rho} B_6 u^T_\lambda u^T_\rho\rangle$			346	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma^\rho D_{\mu\lambda} B_{6\nu}^* u^T_\rho\rangle$ + H.c.			1571	
$i\langle\bar{B}_6 u^\mu u^\nu \sigma_\mu{}^\lambda D_\nu{}^\rho B_6 u^T_\lambda u^T_\rho\rangle$ + H.c.			347	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu u^\lambda \gamma_5 \gamma^\rho D_{\nu\lambda} B_{6\mu}^* u^T_\rho\rangle$ + H.c.			1572	
$\langle\bar{B}_6 u^\mu B_6\rangle\langle u_\mu u^\nu u_\nu\rangle$			348	I	$\langle\bar{B}_{\bar{3}} u^\mu u_\mu \gamma_5 \gamma^\nu B_6^{*\lambda} u^T_\nu u^T_\lambda\rangle$ + H.c.			1573	
$\langle\bar{B}_6 u^\mu D_\mu{}^\nu B_6\rangle\langle u_\nu u^\lambda u_\lambda\rangle$			349	I	$\langle\bar{B}_{\bar{3}} u^\mu u_\mu \gamma_5 \gamma^\nu B_6^{*\lambda} u^T_\lambda u^T_\nu\rangle$ + H.c.			1574	
$\langle\bar{B}_6 u^\mu D^{\nu\lambda} B_6\rangle\langle u_\mu u_\nu u_\lambda\rangle$			350	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\mu B_6^{*\lambda} u^T_\nu u^T_\lambda\rangle$ + H.c.	809		1575	
$\langle\bar{B}_6 u^\mu D_\mu{}^{\nu\lambda\rho} B_6\rangle\langle u_\nu u_\lambda u_\rho\rangle$			351	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\mu B_6^{*\lambda} u^T_\lambda u^T_\nu\rangle$ + H.c.			1576	
$\langle\bar{B}_6 B_6\rangle\langle u^\mu u_\mu\rangle\langle u^\nu u_\nu\rangle$			352	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\nu B_6^{*\lambda} u^T_\mu u^T_\lambda\rangle$ + H.c.			1577	
$\langle\bar{B}_6 B_6\rangle\langle u^\mu u^\nu\rangle\langle u_\mu u_\nu\rangle$			353	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\nu B_6^{*\lambda} u^T_\lambda u^T_\mu\rangle$ + H.c.			1578	
$\langle\bar{B}_6 B_6\rangle\langle u^\mu u_\mu u^\nu u_\nu\rangle$			354	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\mu D_\nu{}^\rho B_6^{*\rho} u^T_\lambda u^T_\rho\rangle$ + H.c.	810		1579	
$\langle\bar{B}_6 D^{\mu\nu} B_6\rangle\langle u_\mu u_\nu\rangle\langle u^\lambda u_\lambda\rangle$			355	I	$\langle\bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5 \gamma_\mu D_\nu{}^\lambda B_6^{*\rho} u^T_\rho u^T_\lambda\rangle$ + H.c.			1580	

(Table continued)

TABLE VIII. *(Continued)*

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$\langle\bar{B}_6 D^{\mu\nu}B_6\rangle\langle u_\mu u^\lambda\rangle\langle u_\nu u_\lambda\rangle$			356	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu\gamma_5\gamma_\mu D^{\lambda\rho}B^*_{6\nu}u^T_\lambda u^T_\rho\rangle$ + H.c.			1581	
$\langle\bar{B}_6 D^{\mu\nu}B_6\rangle\langle u_\mu u_\nu u^\lambda u_\lambda\rangle$			357	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu\gamma_5\gamma_\nu D_\mu{}^\lambda B^{*\rho}_6 u^T_\lambda u^T_\rho\rangle$ + H.c.			1582	
$\langle\bar{B}_6 D^{\mu\nu\lambda\rho}B_6\rangle\langle u_\mu u_\nu\rangle\langle u_\lambda u_\rho\rangle$			358	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu\gamma_5\gamma_\nu D_\mu{}^\lambda B^{*\rho}_6 u^T_\rho u^T_\lambda\rangle$ + H.c.			1583	
$i\langle\bar{B}_6\sigma^{\mu\nu}B_6\rangle\langle u_\mu u_\nu u^\lambda u_\lambda\rangle$			359	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu\gamma_5\gamma_\nu D^{\lambda\rho}B^*_{6\mu}u^T_\lambda u^T_\rho\rangle$ + H.c.			1584	
$i\langle\bar{B}_6\sigma^{\mu\nu}D^{\lambda\rho}B_6\rangle\langle u_\mu u_\nu u_\lambda u_\rho\rangle$			360	I	$\langle\bar{B}_{\bar{3}}\gamma_5\gamma^\mu B^{*\nu}_6\rangle\langle u_\mu u_\nu u^\lambda u_\lambda\rangle$ + H.c.			1585	
$i\langle u^\mu u_\mu\rangle\langle\bar{B}_6 u^\nu u^\lambda\sigma_{\nu\lambda}B_6\rangle$			361	I	$\langle\bar{B}_{\bar{3}}\gamma_5\gamma^\mu B^{*\nu}_6\rangle\langle u_\mu u^\lambda u_\nu u_\lambda\rangle$ + H.c.			1586	
$i\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u^\lambda u^\rho\sigma_{\mu\lambda}D_{\nu\rho}B_6\rangle$ + H.c.			362	I	$\langle\bar{B}_{\bar{3}}\gamma_5\gamma^\mu D^{\nu\lambda}B^{*\rho}_6\rangle\langle u_\mu u_\nu u_\lambda u_\rho\rangle$ + H.c.			1587	
$\langle u^\mu u_\mu\rangle\langle\bar{B}_6 u^\nu B_6 u^T_\nu\rangle$			363	I	$\langle\bar{B}_{\bar{3}}\gamma_5\gamma^\mu D^{\nu\lambda}B^{*\rho}_6\rangle\langle u_\mu u_\nu u_\rho u_\lambda\rangle$ + H.c.			1588	
$\langle u^\mu u_\mu\rangle\langle\bar{B}_6 u^\nu D_\nu{}^\lambda B_6 u^T_\lambda\rangle$			364	I	$\langle u^\mu u_\mu\rangle\langle\bar{B}_{\bar{3}}u^\nu u^\lambda\gamma_5\gamma_\nu B^*_{6\lambda}\rangle$ + H.c.			1589	
$\langle\bar{B}_6 u^\mu u_\mu f_-^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			365	I	$\langle u^\mu u_\mu\rangle\langle\bar{B}_{\bar{3}}u^\nu u^\lambda\gamma_5\gamma_\lambda B^*_{6\nu}\rangle$ + H.c.			1590	
$\langle\bar{B}_6 u^\mu u^\nu f_{-\mu}{}^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	190	I	366	I	$\langle u^\mu u^\nu\rangle\langle\bar{B}_{\bar{3}}u_\mu u^\lambda\gamma_5\gamma_\nu B^*_{6\lambda}\rangle$ + H.c.			1591	
$\langle\bar{B}_6 u^\mu u^\nu f_{-\mu}{}^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.	191	I	367	I	$\langle u^\mu u^\nu\rangle\langle\bar{B}_{\bar{3}}u^\lambda u^\rho\gamma_5\gamma_\mu D_{\nu\lambda}B^*_{6\rho}\rangle$ + H.c.			1592	
$\langle\bar{B}_6 u^\mu u^\nu f_{-\nu}{}^\lambda\gamma_5\gamma_\mu D_\lambda B_6\rangle$ + H.c.			368	I	$\langle u^\mu u^\nu\rangle\langle\bar{B}_{\bar{3}}u^\lambda u^\rho\gamma_5\gamma_\mu D_{\nu\rho}B^*_{6\lambda}\rangle$ + H.c.			1593	
$\langle\bar{B}_6 u^\mu u^\nu f_{-\nu}{}^\lambda\gamma_5\gamma_\lambda D_\mu B_6\rangle$ + H.c.			369	I	$\langle u^\mu u^\nu\rangle\langle\bar{B}_{\bar{3}}u^\lambda u^\rho\gamma_5\gamma_\mu D_{\lambda\rho}B^*_{6\nu}\rangle$ + H.c.			1594	
$\langle\bar{B}_6 u^\mu u^\nu f_-^{\lambda\rho}\gamma_5\gamma_\lambda D_{\mu\nu}B_6\rangle$ + H.c.			370	I	$\langle u^\mu u_\mu\rangle\langle\bar{B}_{\bar{3}}u^\nu\gamma_5\gamma_\nu B^{*\lambda}_6 u^T_\lambda\rangle$ + H.c.			1595	
$\langle\bar{B}_6 u^\mu u_\mu h^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			371	I	$\langle u^\mu u^\nu\rangle\langle\bar{B}_{\bar{3}}u^\lambda\gamma_5\gamma_\mu D_{\nu\lambda}B^{*\rho}_6 u^T_\rho\rangle$ + H.c.			1596	
$\langle\bar{B}_6 u^\mu u^\nu h_\mu{}^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	192	I	372	I	$\langle\bar{B}_{\bar{3}}u^\mu u_\mu f_-^{\nu\lambda}D_\nu B^*_{6\lambda}\rangle$ + H.c.			1597	
$\langle\bar{B}_6 u^\mu u^\nu h_\mu{}^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.	193	I	373	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_{-\mu}{}^\lambda D_\nu B^*_{6\lambda}\rangle$ + H.c.	811		1598	
$\langle\bar{B}_6 u^\mu u^\nu h_\nu{}^\lambda\gamma_5\gamma_\mu D_\lambda B_6\rangle$ + H.c.			374	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_{-\mu}{}^\lambda D_\lambda B^*_{6\nu}\rangle$ + H.c.	812		1599	
$\langle\bar{B}_6 u^\mu u^\nu h_\nu{}^\lambda\gamma_5\gamma_\lambda D_\mu B_6\rangle$ + H.c.			375	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_{-\nu}{}^\lambda D_\mu B^*_{6\lambda}\rangle$ + H.c.	813		1600	
$\langle\bar{B}_6 u^\mu u^\nu h^{\lambda\rho}\gamma_5\gamma_\mu D_{\nu\lambda\rho}B_6\rangle$ + H.c.	194	I	376	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_{-\nu}{}^\lambda D_\lambda B^*_{6\mu}\rangle$ + H.c.	814		1601	
$\langle\bar{B}_6 u^\mu u^\nu h^{\lambda\rho}\gamma_5\gamma_\nu D_{\mu\lambda\rho}B_6\rangle$ + H.c.			377	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_-^{\lambda\rho}D_{\mu\nu\lambda}B^*_{6\rho}\rangle$ + H.c.			1602	
$\langle\bar{B}_6 u^\mu u^\nu h^{\lambda\rho}\gamma_5\gamma_\lambda D_{\mu\nu\rho}B_6\rangle$ + H.c.			378	I	$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_-^{\lambda\rho}\sigma_{\mu\nu}D_\lambda B^*_{6\rho}\rangle$ + H.c.	815		1603	
$\langle\bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\mu D^\lambda B_6 f^T_{-\nu\lambda}\rangle$ + H.c.	195	I	379	I	$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_-^{\lambda\rho}\sigma_{\mu\lambda}D_\nu B^*_{6\rho}\rangle$ + H.c.	816		1604	
$\langle\bar{B}_6 u^\mu u^\nu\gamma_5\gamma^\lambda D_\mu B_6 f^T_{-\nu\lambda}\rangle$ + H.c.	196	I	380	I	$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_-^{\lambda\rho}\sigma_{\mu\lambda}D_\rho B^*_{6\nu}\rangle$ + H.c.	817		1605	
$\langle\bar{B}_6 u^\mu u^\nu\gamma_5\gamma^\lambda D_\mu B_6 h^T_{\nu\lambda}\rangle$ + H.c.	197	I	381	I	$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_-^{\lambda\rho}\sigma_{\nu\lambda}D_\mu B^*_{6\rho}\rangle$ + H.c.	818		1606	
$\langle\bar{B}_6 u^\mu f_{-\mu}{}^\nu u^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			382	I	$\langle\bar{B}_{\bar{3}}u^\mu u_\mu h^{\nu\lambda}D_\nu B^*_{6\lambda}\rangle$ + H.c.			1607	
$\langle\bar{B}_6 u^\mu f_{-\mu}{}^\nu u^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.			383	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu h_\mu{}^\lambda D_\nu B^*_{6\lambda}\rangle$ + H.c.	819		1608	
$\langle\bar{B}_6 u^\mu f_{-\mu}{}^\nu\gamma_5\gamma_\nu D^\lambda B_6 u^T_\lambda\rangle$ + H.c.	198	I	384	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu h_\mu{}^\lambda D_\lambda B^*_{6\nu}\rangle$ + H.c.	820		1609	
$\langle\bar{B}_6 u^\mu f_{-\mu}{}^\nu\gamma_5\gamma^\lambda D_\nu B_6 u^T_\lambda\rangle$ + H.c.	199	I	385	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu h_\nu{}^\lambda D_\mu B^*_{6\lambda}\rangle$ + H.c.			1610	
$\langle\bar{B}_6 u^\mu f_-^{\nu\lambda}\gamma_5\gamma_\mu D_\nu B_6 u^T_\lambda\rangle$ + H.c.	200	I	386	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu h_\nu{}^\lambda D_\lambda B^*_{6\mu}\rangle$ + H.c.			1611	
$\langle\bar{B}_6 u^\mu f_-^{\nu\lambda}\gamma_5\gamma_\nu D_\mu B_6 u^T_\lambda\rangle$ + H.c.	201	I	387	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu h^{\lambda\rho}D_{\mu\nu\lambda}B^*_{6\rho}\rangle$ + H.c.			1612	
$\langle\bar{B}_6 u^\mu f_-^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_6 u^T_\mu\rangle$ + H.c.	202	I	388	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu h^{\lambda\rho}D_{\mu\lambda\rho}B^*_{6\nu}\rangle$ + H.c.	821		1613	
$\langle\bar{B}_6 u^\mu f_-^{\nu\lambda}\gamma_5\gamma_\nu D_\mu{}^\rho B_6 u^T_\rho\rangle$ + H.c.	203	I	389	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu h^{\lambda\rho}D_{\nu\lambda\rho}B^*_{6\mu}\rangle$ + H.c.			1614	
$\langle\bar{B}_6 u^\mu h_\mu{}^\nu u^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			390	I	$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu h^{\lambda\rho}\sigma_{\mu\nu}D_\lambda B^*_{6\rho}\rangle$ + H.c.	822		1615	
$\langle\bar{B}_6 u^\mu h_\mu{}^\nu\gamma_5\gamma_\nu D^\lambda B_6 u^T_\lambda\rangle$ + H.c.	204	I	391	I	$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu h^{\lambda\rho}\sigma_{\mu\lambda}D_\nu B^*_{6\rho}\rangle$ + H.c.	823		1616	
$\langle\bar{B}_6 u^\mu h_\mu{}^\nu\gamma_5\gamma^\lambda D_\nu B_6 u^T_\lambda\rangle$ + H.c.	205	I	392	I	$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu h^{\lambda\rho}\sigma_{\mu\lambda}D_\rho B^*_{6\nu}\rangle$ + H.c.			1617	
$\langle\bar{B}_6 u^\mu h^{\nu\lambda}\gamma_5\gamma_\mu D_\nu B_6 u^T_\lambda\rangle$ + H.c.	206	I	393	I	$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu h^{\lambda\rho}\sigma_{\nu\lambda}D_\mu B^*_{6\rho}\rangle$ + H.c.			1618	
$\langle\bar{B}_6 u^\mu h^{\nu\lambda}\gamma_5\gamma_\nu D_\mu B_6 u^T_\lambda\rangle$ + H.c.	207	I	394	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu D_\mu B^{*\lambda}_6 f^T_{-\nu\lambda}\rangle$ + H.c.	824		1619	
$\langle\bar{B}_6 u^\mu h^{\nu\lambda}\gamma_5\gamma_\mu D_\nu{}^\rho B_6 u^T_\rho\rangle$ + H.c.	208	I	395	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu D_\nu B^{*\lambda}_6 f^T_{-\mu\lambda}\rangle$ + H.c.			1620	
$\langle\bar{B}_6 u^\mu h^{\nu\lambda}\gamma_5\gamma^\rho D_{\mu\nu\lambda}B_6 u^T_\rho\rangle$ + H.c.	209	I	396	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu D^\lambda B^*_{6\mu}f^T_{-\nu\lambda}\rangle$ + H.c.	825		1621	
$\langle\bar{B}_6\gamma_5\gamma^\mu D^\nu B_6\rangle\langle u_\mu u^\lambda f_{-\nu\lambda}\rangle$ + H.c.			397	I	$\langle\bar{B}_{\bar{3}}u^\mu u^\nu D^\lambda B^*_{6\nu}f^T_{-\mu\lambda}\rangle$ + H.c.			1622	
$\langle\bar{B}_6\gamma_5\gamma^\mu D^\nu B_6\rangle\langle u_\nu u^\lambda f_{-\mu\lambda}\rangle$ + H.c.			398	I	$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu\sigma_\mu{}^\lambda D_\nu B^{*\rho}_6 f^T_{-\lambda\rho}\rangle$ + H.c.	826		1623	
$\langle\bar{B}_6\gamma_5\gamma^\mu D^\nu B_6\rangle\langle u_\mu u^\lambda h_{\nu\lambda}\rangle$ + H.c.			399	I	$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu\sigma_\mu{}^\lambda D^\rho B^*_{6\nu}f^T_{-\lambda\rho}\rangle$ + H.c.			1624	
$\langle\bar{B}_6\gamma_5\gamma^\mu D^\nu B_6\rangle\langle u_\nu u^\lambda h_{\mu\lambda}\rangle$ + H.c.			400	I	$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu\sigma_\mu{}^\lambda D_\mu B^{*\rho}_6 f^T_{-\lambda\rho}\rangle$ + H.c.			1625	
$\langle\bar{B}_6\gamma_5\gamma^\mu D^{\nu\lambda\rho}B_6\rangle\langle u_\mu u_\nu h_{\lambda\rho}\rangle$ + H.c.			401	I	$\langle\bar{B}_{\bar{3}}u^\mu f_{-\mu}{}^\nu u^\lambda D_\nu B^*_{6\lambda}\rangle$ + H.c.	827		1626	
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 u_\mu u_\nu f_{-\lambda\rho}B_6\rangle$ + H.c.	210	I	402	I	$\langle\bar{B}_{\bar{3}}u^\mu f_{-\mu}{}^\nu u^\lambda D_\lambda B^*_{6\nu}\rangle$ + H.c.	828		1627	

(Table continued)

TABLE VIII. (Continued)

O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$	O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 u_\mu u_\nu f_{-\lambda}{}^\sigma D_{\rho\sigma}B_6\rangle$ + H.c.	211	I	403	I	$\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}u_\mu D_\nu B_{6\lambda}\rangle$ + H.c.			1628	
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 u_\mu u^\sigma f_{-\nu\lambda}D_{\rho\sigma}B_6\rangle$ + H.c.	212	I	404	I	$\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}u_\nu D_\mu B_{6\lambda}\rangle$ + H.c.			1629	
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 u_\mu u_\nu h_\lambda{}^\sigma D_{\rho\sigma}B_6\rangle$ + H.c.	213	I	405	I	$\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}u_\nu D_\lambda B_{6\mu}\rangle$ + H.c.			1630	
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 u_\mu u^\sigma D_{\lambda\sigma}B_6 f^T_{-\lambda\rho}\rangle$ + H.c.			406	I	$\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}u^\rho D_{\mu\nu\rho}B_{6\lambda}\rangle$ + H.c.			1631	
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 u_\mu f_{-\nu\lambda}u^\sigma D_{\rho\sigma}B_6\rangle$ + H.c.	214	I	407	I	$i\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}u^\rho\sigma_{\mu\nu}D_\lambda B_{6\rho}\rangle$ + H.c.	829		1632	
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 u_\mu f_{-\nu\lambda}B_6 u^T_\rho\rangle$ + H.c.			408	I	$i\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}u^\rho\sigma_{\mu\nu}D_\rho B_{6\lambda}\rangle$ + H.c.	830		1633	
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 u_\mu f_{-\nu\lambda}D_\rho{}^\sigma B_6 u^T_\sigma\rangle$ + H.c.			409	I	$i\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}u^\rho\sigma_{\mu\rho}D_\nu B_{6\lambda}\rangle$ + H.c.			1634	
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 u_\mu f_{-\nu}{}^\sigma D_{\lambda\sigma}B_6 u^T_\rho\rangle$ + H.c.			410	I	$i\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}u^\rho\sigma_{\nu\lambda}D_\mu B_{6\rho}\rangle$ + H.c.			1635	
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 u_\mu h_\nu{}^\sigma D_{\lambda\sigma}B_6 u^T_\rho\rangle$ + H.c.			411	I	$\langle\bar{B}_{\bar{3}}u^\mu f_{-\mu}{}^\nu D_\nu B_6^{*\lambda}u^T_\lambda\rangle$ + H.c.	831		1636	
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_6 D_\mu{}^\sigma B_6\rangle\langle u_\nu u_\sigma f_{-\lambda\rho}\rangle$ + H.c.			412	I	$\langle\bar{B}_{\bar{3}}u^\mu f_{-\mu}{}^\nu D^\lambda B_{6\nu}^* u^T_\lambda\rangle$ + H.c.	832		1637	
$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu u^\sigma\rangle\langle\bar{B}_6 f_{-\nu\lambda}D_{\rho\sigma}B_6\rangle$			413	I	$\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}D_\mu B_{6\nu}^* u^T_\lambda\rangle$ + H.c.	833		1638	
$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu f_{-\nu\lambda}\rangle\langle\bar{B}_6 u_\rho B_6\rangle$			414	I	$\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}D_\nu B_{6\mu}^* u^T_\lambda\rangle$ + H.c.	834		1639	
$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu f_{-\nu\lambda}\rangle\langle\bar{B}_6 u^\sigma D_{\rho\sigma}B_6\rangle$			415	I	$\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}D_\nu B_{6\lambda}^* u^T_\mu\rangle$ + H.c.	835		1640	
$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu h_\nu{}^\sigma\rangle\langle\bar{B}_6 u_\lambda D_{\rho\sigma}B_6\rangle$			416	I	$\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}D_{\mu\nu}{}^\rho B_{6\lambda}^* u^T_\rho\rangle$ + H.c.	836		1641	
$\langle\bar{B}_6 u^\mu\nabla^\nu f_{-\mu\nu}B_6\rangle$ + H.c.	215	I	417	I	$i\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}\sigma_{\mu\nu}D_\lambda B_6^{*\rho}u^T_\rho\rangle$ + H.c.	837		1642	
$\langle\bar{B}_6 u^\mu\nabla^\nu f_{-\mu}{}^\lambda D_{\nu\lambda}B_6\rangle$ + H.c.	216	I	418	I	$i\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}\sigma_{\mu\nu}D^\rho B_{6\lambda}^* u^T_\rho\rangle$ + H.c.	838		1643	
$\langle\bar{B}_6 u^\mu\nabla^\nu f_{-\nu}{}^\lambda D_{\mu\lambda}B_6\rangle$ + H.c.	217	I	419	I	$i\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}\sigma_\mu{}^\rho D_\nu B_{6\lambda}^* u^T_\rho\rangle$ + H.c.	839		1644	
$i\langle\bar{B}_6 u^\mu\nabla_\mu f_{-}{}^{\nu\lambda}\sigma_{\nu\lambda}B_6\rangle$ + H.c.	218	I	420	I	$i\langle\bar{B}_{\bar{3}}u^\mu f_{-}{}^{\nu\lambda}\sigma_{\nu\lambda}D_\mu B_6^{*\rho}u^T_\rho\rangle$ + H.c.	840		1645	
$i\langle\bar{B}_6 u^\mu\nabla^\nu f_{-\nu}{}^\lambda\sigma_{\mu\lambda}B_6\rangle$ + H.c.	219	I	421	I	$\langle\bar{B}_{\bar{3}}u^\mu h_\mu{}^\nu u^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.			1646	
$i\langle\bar{B}_6 u^\mu\nabla^\nu f_{-}{}^{\lambda\rho}\sigma_{\mu\lambda}D_{\nu\rho}B_6\rangle$ + H.c.	220	I	422	I	$\langle\bar{B}_{\bar{3}}u^\mu h_\mu{}^\nu u^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.			1647	
$i\langle\bar{B}_6 u^\mu\nabla^\nu f_{-}{}^{\lambda\rho}\sigma_{\nu\lambda}D_{\mu\rho}B_6\rangle$ + H.c.	221	I	423	I	$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.			1648	
$\langle\bar{B}_6 u^\mu\nabla_\mu h^{\nu\lambda}D_{\nu\lambda}B_6\rangle$ + H.c.	222	I	424	I	$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u_\nu D_\mu B_{6\lambda}^*\rangle$ + H.c.			1649	
$\langle\bar{B}_6 u^\mu\nabla^\nu h^{\lambda\rho}D_{\mu\nu\lambda\rho}B_6\rangle$ + H.c.	223	I	425	I	$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u_\nu D_\lambda B_{6\mu}^*\rangle$ + H.c.			1650	
$i\langle\bar{B}_6 u^\mu\nabla^\nu h^{\lambda\rho}\sigma_{\mu\nu}D_{\lambda\rho}B_6\rangle$ + H.c.	224	I	426	I	$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u^\rho D_{\mu\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			1651	
$\langle\bar{B}_6 u^\mu B_6\nabla^\nu f^T_{-\mu\nu}\rangle$	225	I	427	I	$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u^\rho D_{\mu\nu\rho}B_{6\lambda}^*\rangle$ + H.c.			1652	
$\langle\bar{B}_6 u^\mu D_\mu{}^\nu B_6\nabla^\lambda f^T_{-\nu\lambda}\rangle$	226	I	428	I	$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u^\rho D_{\nu\lambda\rho}B_{6\mu}^*\rangle$ + H.c.			1653	
$\langle\bar{B}_6 f_{-}{}^{\mu\nu}f_{-\mu\nu}B_6\rangle$			429	I	$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u^\rho\sigma_{\mu\nu}D_\lambda B_{6\rho}^*\rangle$ + H.c.			1654	
$\langle\bar{B}_6 f_{-}{}^{\mu\nu}f_{-\mu}{}^\lambda D_{\nu\lambda}B_6\rangle$			430	I	$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u^\rho\sigma_{\mu\nu}D_\rho B_{6\lambda}^*\rangle$ + H.c.			1655	
$i\langle\bar{B}_6 f_{-}{}^{\mu\nu}f_{-\mu}{}^\lambda\sigma_{\nu\lambda}B_6\rangle$	227	I	431	I	$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u^\rho\sigma_{\mu\rho}D_\nu B_{6\lambda}^*\rangle$ + H.c.			1656	
$i\langle\bar{B}_6 f_{-}{}^{\mu\nu}f_{-}{}^{\lambda\rho}\sigma_{\mu\lambda}D_{\nu\rho}B_6\rangle$	228	I	432	I	$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u^\rho\sigma_{\nu\rho}D_\mu B_{6\lambda}^*\rangle$ + H.c.			1657	
$i\langle\bar{B}_6 f_{-}{}^{\mu\nu}h_\mu{}^\lambda\sigma_{\nu\lambda}B_6\rangle$ + H.c.	229	I	433	I	$\langle\bar{B}_{\bar{3}}u^\mu h_\mu{}^\nu D_\nu B_6^{*\lambda}u^T_\lambda\rangle$ + H.c.	841		1658	
$\langle\bar{B}_6 f_{-}{}^{\mu\nu}B_6 f^T_{-\mu\nu}\rangle$	230	I	434	I	$\langle\bar{B}_{\bar{3}}u^\mu h_\mu{}^\nu D^\lambda B_{6\nu}^* u^T_\lambda\rangle$ + H.c.	842		1659	
$\langle\bar{B}_6 f_{-}{}^{\mu\nu}D_\mu{}^\lambda B_6 f^T_{-\nu\lambda}\rangle$	231	I	435	I	$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}D_\mu B_{6\nu}^* u^T_\lambda\rangle$ + H.c.	843		1660	
$\langle\bar{B}_6 h^{\mu\nu}h_{\mu\nu}B_6\rangle$	232	I	436	I	$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}D_\nu B_{6\mu}^* u^T_\lambda\rangle$ + H.c.			1661	
$i\langle\bar{B}_6 h^{\mu\nu}h_\mu{}^\lambda\sigma_{\nu\lambda}B_6\rangle$	233	I	437	I	$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}D_\nu B_{6\lambda}^* u^T_\mu\rangle$ + H.c.			1662	
$\langle\bar{B}_6 h^{\mu\nu}B_6 h^T_{\mu\nu}\rangle$	234	I	438	I	$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}D_{\mu\nu\lambda}B_6^{*\rho}u^T_\rho\rangle$ + H.c.	844		1663	
$\langle\bar{B}_6 B_6\rangle\langle u^\mu\nabla^\nu f_{-\mu\nu}\rangle$			439	I	$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}D_{\mu\nu}{}^\rho B_{6\lambda}^* u^T_\rho\rangle$ + H.c.	845		1664	
$\langle\bar{B}_6 B_6\rangle\langle h^{\mu\nu}h_{\mu\nu}\rangle$			440	I	$\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}D_{\nu\lambda}{}^\rho B_{6\mu}^* u^T_\rho\rangle$ + H.c.			1665	
$\langle\bar{B}_6 D^{\mu\nu}B_6\rangle\langle u_\mu\nabla^\lambda f_{-\nu\lambda}\rangle$			441	I	$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}\sigma_{\mu\nu}D_\lambda B_6^{*\rho}u^T_\rho\rangle$ + H.c.			1666	
$\langle\bar{B}_6 D^{\mu\nu}B_6\rangle\langle u^\lambda\nabla_\mu f_{-\nu\lambda}\rangle$			442	I	$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}\sigma_{\mu\nu}D^\rho B_{6\lambda}^* u^T_\rho\rangle$ + H.c.			1667	
$\langle\bar{B}_6 D^{\mu\nu}B_6\rangle\langle u^\lambda\nabla_\mu h_{\nu\lambda}\rangle$			443	I	$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}\sigma_\mu{}^\rho D_\nu B_{6\lambda}^* u^T_\rho\rangle$ + H.c.	846		1668	
$\langle\bar{B}_6 D^{\mu\nu\lambda\rho}B_6\rangle\langle u_\mu\nabla_\nu h_{\lambda\rho}\rangle$			444	I	$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}\sigma_\nu{}^\rho D_\mu B_{6\lambda}^* u^T_\rho\rangle$ + H.c.			1669	
$i\langle\bar{B}_6 f_{+}{}^{\mu\nu}u_\mu u_\nu B_6\rangle$ + H.c.	235	I	445	I	$\langle\bar{B}_{\bar{3}}u^\mu D_\mu B_6^{*\nu}u^{T\lambda}f^T_{-\nu\lambda}\rangle$ + H.c.			1670	
$i\langle\bar{B}_6 f_{+}{}^{\mu\nu}u_\mu u^\lambda D_{\nu\lambda}B_6\rangle$ + H.c.	236	I	446	I	$\langle\bar{B}_{\bar{3}}u^\mu D^\nu B_{6\mu}^* u^{T\lambda}f^T_{-\nu\lambda}\rangle$ + H.c.			1671	
$i\langle\bar{B}_6 f_{+}{}^{\mu\nu}u^\lambda u_\mu D_{\nu\lambda}B_6\rangle$ + H.c.			447	I	$\langle\bar{B}_{\bar{3}}u^\mu D^\nu B_6^{*\lambda}u^T{}_\nu f^T_{-\mu\lambda}\rangle$ + H.c.			1672	
$\langle\bar{B}_6 f_{+}{}^{\mu\nu}u_\mu u^\lambda\sigma_{\nu\lambda}B_6\rangle$ + H.c.	237	I	448	I	$\langle\bar{B}_{\bar{3}}u^\mu D^\nu B_6^{*\lambda}u^T{}_\lambda f^T_{-\mu\nu}\rangle$ + H.c.			1673	
$\langle\bar{B}_6 f_{+}{}^{\mu\nu}u^\lambda u_\mu\sigma_{\nu\lambda}B_6\rangle$ + H.c.	238	I	449	I	$i\langle\bar{B}_{\bar{3}}u^\mu\sigma_\mu{}^\nu D^\lambda B_6^{*\rho}u^T{}_\lambda f^T_{-\nu\rho}\rangle$ + H.c.			1674	
$\langle\bar{B}_6 f_{+}{}^{\mu\nu}u^\lambda u_\lambda\sigma_{\mu\nu}B_6\rangle$ + H.c.	239	I	450	I	$i\langle\bar{B}_{\bar{3}}u^\mu\sigma_\mu{}^\nu D^\lambda B_6^{*\rho}u^T{}_\rho f^T_{-\nu\lambda}\rangle$ + H.c.			1675	

(Table continued)

TABLE VIII. *(Continued)*

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$\langle\bar{B}_6 f_+{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\nu}D_{\lambda\rho}B_6\rangle$ + H.c.	240	I	451	I	$i\langle\bar{B}_{\bar{3}}u^\mu\sigma^{\nu\lambda}D_\mu B_6^{*\rho}u^T{}_\nu f^T_{-\lambda\rho}\rangle$ + H.c.			1676	
$\langle\bar{B}_6 f_+{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\lambda}D_{\nu\rho}B_6\rangle$ + H.c.	241	I	452	I	$\langle\bar{B}_{\bar{3}}f_-{}^{\mu\nu}u_\mu u^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.			1677	
$\langle\bar{B}_6 f_+{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\rho}D_{\nu\lambda}B_6\rangle$ + H.c.	242	I	453	I	$\langle\bar{B}_{\bar{3}}f_-{}^{\mu\nu}u_\mu u^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.			1678	
$i\langle\bar{B}_6 f_+{}^{\mu\nu}u_\mu B_6 u^T{}_\nu\rangle$ + H.c.	243	I	454	I	$\langle\bar{B}_{\bar{3}}f_-{}^{\mu\nu}u^\lambda u_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.			1679	
$i\langle\bar{B}_6 f_+{}^{\mu\nu}u_\mu D^\lambda B_6 u^T{}_\lambda\rangle$ + H.c.	244	I	455	I	$\langle\bar{B}_{\bar{3}}f_-{}^{\mu\nu}u^\lambda u_\mu D_\lambda B_{6\nu}^*\rangle$ + H.c.			1680	
$i\langle\bar{B}_6 f_+{}^{\mu\nu}u^\lambda D_{\mu\lambda}B_6 u^T{}_\nu\rangle$ + H.c.	245	I	456	I	$i\langle\bar{B}_{\bar{3}}f_-{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\nu}D_\lambda B_{6\rho}^*\rangle$ + H.c.			1681	
$\langle\bar{B}_6 f_+{}^{\mu\nu}u_\mu\sigma_\nu{}^\lambda B_6 u^T{}_\lambda\rangle$ + H.c.	246	I	457	I	$i\langle\bar{B}_{\bar{3}}f_-{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\lambda}D_\nu B_{6\rho}^*\rangle$ + H.c.			1682	
$\langle\bar{B}_6 f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\nu}B_6 u^T{}_\lambda\rangle$ + H.c.	247	I	458	I	$i\langle\bar{B}_{\bar{3}}f_-{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\nu}D_\rho B_{6\lambda}^*\rangle$ + H.c.			1683	
$\langle\bar{B}_6 f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\lambda}B_6 u^T{}_\nu\rangle$ + H.c.			459	I	$\langle\bar{B}_{\bar{3}}D^\mu B_6^{*\nu}\rangle\langle u_\mu u^\lambda f_{-\nu\lambda}\rangle$ + H.c.			1684	
$\langle\bar{B}_6 f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\nu}D_\lambda{}^\rho B_6 u^T{}_\rho\rangle$ + H.c.	248	I	460	I	$\langle\bar{B}_{\bar{3}}D^\mu B_6^{*\nu}\rangle\langle u_\nu u^\lambda f_{-\mu\lambda}\rangle$ + H.c.			1685	
$\langle\bar{B}_6 f_+{}^{\mu\nu}u^\lambda\sigma_{\mu\lambda}D_\nu{}^\rho B_6 u^T{}_\rho\rangle$ + H.c.	249	I	461	I	$\langle\bar{B}_{\bar{3}}D^\mu B_6^{*\nu}\rangle\langle u^\lambda u_\mu f_{-\nu\lambda}\rangle$ + H.c.			1686	
$\langle\bar{B}_6 f_+{}^{\mu\nu}u^\lambda\sigma_\mu{}^\rho D_{\nu\lambda}B_6 u^T{}_\rho\rangle$ + H.c.			462	I	$\langle\bar{B}_{\bar{3}}D^\mu B_6^{*\nu}\rangle\langle u^\lambda u_\nu f_{-\mu\lambda}\rangle$ + H.c.			1687	
$i\langle\bar{B}_6 f_+{}^{\mu\nu}B_6 u^T{}_\mu u^T{}_\nu\rangle$	250	I	463	I	$\langle\bar{B}_{\bar{3}}D^\mu B_6^{*\nu}\rangle\langle u^\lambda u_\lambda f_{-\mu\nu}\rangle$ + H.c.			1688	
$i\langle\bar{B}_6 f_+{}^{\mu\nu}D_\mu{}^\lambda B_6 u^T{}_\nu u^T{}_\lambda\rangle$ + H.c.	251	I	464	I	$\langle\bar{B}_{\bar{3}}D^\mu B_6^{*\nu}\rangle\langle u_\mu u^\lambda h_{\nu\lambda}\rangle$ + H.c.			1689	
$\langle\bar{B}_6 f_+{}^{\mu\nu}\sigma_{\mu\nu}B_6 u^{T\lambda}u^T{}_\lambda\rangle$			465	I	$\langle\bar{B}_{\bar{3}}D^\mu B_6^{*\nu}\rangle\langle u_\nu u^\lambda h_{\mu\lambda}\rangle$ + H.c.			1690	
$\langle\bar{B}_6 f_+{}^{\mu\nu}\sigma_\mu{}^\lambda B_6 u^T{}_\nu u^T{}_\lambda\rangle$ + H.c.			466	I	$\langle\bar{B}_{\bar{3}}D^\mu B_6^{*\nu}\rangle\langle u^\lambda u_\mu h_{\nu\lambda}\rangle$ + H.c.			1691	
$\langle\bar{B}_6 f_+{}^{\mu\nu}\sigma_{\mu\nu}D^{\lambda\rho}B_6 u^T{}_\lambda u^T{}_\rho\rangle$			467	I	$\langle\bar{B}_{\bar{3}}D^{\mu\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu u_\nu f_{-\lambda\rho}\rangle$ + H.c.			1692	
$\langle\bar{B}_6 f_+{}^{\mu\nu}\sigma_\mu{}^\lambda D_\nu{}^\rho B_6 u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.			468	I	$\langle\bar{B}_{\bar{3}}D^{\mu\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu u_\rho h_{\nu\lambda}\rangle$ + H.c.			1693	
$i\langle\bar{B}_6 u^\mu f_{+\mu}{}^\nu u_\nu B_6\rangle$	252	I	469	I	$i\langle\bar{B}_{\bar{3}}\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\nu f_{-\lambda\rho}\rangle$ + H.c.			1694	
$i\langle\bar{B}_6 u^\mu f_{+\mu}{}^\nu u^\lambda D_{\nu\lambda}B_6\rangle$ + H.c.	253	I	470	I	$i\langle\bar{B}_{\bar{3}}\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\lambda f_{-\nu\rho}\rangle$ + H.c.			1695	
$\langle\bar{B}_6 u^\mu f_{+\mu}{}^\nu u^\lambda\sigma_{\nu\lambda}B_6\rangle$ + H.c.	254	I	471	I	$i\langle\bar{B}_{\bar{3}}\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\rho f_{-\nu\lambda}\rangle$ + H.c.			1696	
$\langle\bar{B}_6 u^\mu f_+{}^{\nu\lambda}u_\mu\sigma_{\nu\lambda}B_6\rangle$	255	I	472	I	$i\langle\bar{B}_{\bar{3}}\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\lambda u_\mu f_{-\nu\rho}\rangle$ + H.c.			1697	
$\langle\bar{B}_6 u^\mu f_+{}^{\nu\lambda}u^\rho\sigma_{\lambda\rho}D_{\mu\nu}B_6\rangle$	256	I	473	I	$i\langle\bar{B}_{\bar{3}}\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\nu h_{\lambda\rho}\rangle$ + H.c.			1698	
$\langle\bar{B}_6 u^\mu f_+{}^{\nu\lambda}u^\rho\sigma_{\nu\lambda}D_{\mu\rho}B_6\rangle$	257	I	474	I	$i\langle\bar{B}_{\bar{3}}\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\lambda h_{\nu\rho}\rangle$ + H.c.			1699	
$i\langle\bar{B}_6 B_6\rangle\langle f_+{}^{\mu\nu}u_\mu u_\nu\rangle$			475	I	$i\langle\bar{B}_{\bar{3}}\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\rho h_{\nu\lambda}\rangle$ + H.c.			1700	
$i\langle\bar{B}_6 D^{\mu\nu}B_6\rangle\langle f_{+\mu}{}^\lambda u_\nu u_\lambda\rangle$ + H.c.			476	I	$\langle u^\mu u^\nu\rangle\langle\bar{B}_{\bar{3}}f_{-\mu}{}^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.			1701	
$\langle\bar{B}_6\sigma^{\mu\nu}B_6\rangle\langle f_{+\mu\nu}u^\lambda u_\lambda\rangle$	258	I	477	I	$\langle u^\mu u^\nu\rangle\langle\bar{B}_{\bar{3}}f_{-\mu}{}^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.			1702	
$\langle\bar{B}_6\sigma^{\mu\nu}B_6\rangle\langle f_{+\mu}{}^\lambda u_\nu u_\lambda\rangle$ + H.c.	259	I	478	I	$i\langle u^\mu u^\nu\rangle\langle\bar{B}_{\bar{3}}f_-{}^{\lambda\rho}\sigma_{\mu\lambda}D_\nu B_{6\rho}^*\rangle$ + H.c.			1703	
$\langle\bar{B}_6\sigma^{\mu\nu}D^{\lambda\rho}B_6\rangle\langle f_{+\mu\nu}u_\lambda u_\rho\rangle$	260	I	479	I	$i\langle u^\mu u^\nu\rangle\langle\bar{B}_{\bar{3}}f_-{}^{\lambda\rho}\sigma_{\mu\lambda}D_\rho B_{6\nu}^*\rangle$ + H.c.			1704	
$\langle\bar{B}_6\sigma^{\mu\nu}D^{\lambda\rho}B_6\rangle\langle f_{+\mu\lambda}u_\nu u_\rho\rangle$ + H.c.	261	I	480	I	$\langle u^\mu f_{-\mu}{}^\nu\rangle\langle\bar{B}_{\bar{3}}u^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.			1705	
$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u_\mu u_\nu B_6\rangle$			481		$\langle u^\mu f_{-\mu}{}^\nu\rangle\langle\bar{B}_{\bar{3}}u^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.			1706	
$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u_\mu u^\lambda D_{\nu\lambda}B_6\rangle$ + H.c.			482		$i\langle u^\mu f_-{}^{\nu\lambda}\rangle\langle\bar{B}_{\bar{3}}u^\rho\sigma_{\mu\nu}D_\lambda B_{6\rho}^*\rangle$ + H.c.			1707	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u_\mu u^\lambda\sigma_{\nu\lambda}B_6\rangle$ + H.c.			483		$i\langle u^\mu f_-{}^{\nu\lambda}\rangle\langle\bar{B}_{\bar{3}}u^\rho\sigma_{\mu\nu}D_\rho B_{6\lambda}^*\rangle$ + H.c.			1708	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda u_\lambda\sigma_{\mu\nu}B_6\rangle$			484		$\langle\bar{B}_{\bar{3}}u^\mu\nabla_\mu f_-{}^{\nu\lambda}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	847		1709	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda u^\rho\sigma_{\mu\nu}D_{\lambda\rho}B_6\rangle$			485		$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_{-\mu}{}^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	848		1710	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda u^\rho\sigma_{\mu\lambda}D_{\nu\rho}B_6\rangle$ + H.c.			486		$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_{-\nu}{}^\lambda\gamma_5\gamma_\mu B_{6\lambda}^*\rangle$ + H.c.	849		1711	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u_\mu\sigma_\nu{}^\lambda B_6 u^T{}_\lambda\rangle$			487		$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_{-\nu}{}^\lambda\gamma_5\gamma_\lambda B_{6\mu}^*\rangle$ + H.c.	850		1712	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda\sigma_{\mu\nu}B_6 u^T{}_\lambda\rangle$			488		$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_-{}^{\lambda\rho}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	851		1713	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda\sigma_{\mu\nu}D_\lambda{}^\rho B_6 u^T{}_\rho\rangle$			489		$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_-{}^{\lambda\rho}\gamma_5\gamma_\nu D_{\mu\lambda}B_{6\rho}^*\rangle$ + H.c.	852		1714	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda\sigma_{\mu\lambda}D_\nu{}^\rho B_6 u^T{}_\rho\rangle$			490		$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_-{}^{\lambda\rho}\gamma_5\gamma_\lambda D_{\mu\nu}B_{6\rho}^*\rangle$ + H.c.	853		1715	
$\langle f_+{}^{\mu\nu}\rangle\langle u_\mu u^\lambda\rangle\langle\bar{B}_6\sigma_{\nu\lambda}B_6\rangle$			491		$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_-{}^{\lambda\rho}\gamma_5\gamma_\lambda D_{\nu\rho}B_{6\mu}^*\rangle$ + H.c.	854		1716	
$\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u_\lambda\rangle\langle\bar{B}_6\sigma_{\mu\nu}B_6\rangle$			492		$\langle\bar{B}_{\bar{3}}u^\mu\nabla_\mu h^{\nu\lambda}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	855		1717	
$\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u^\rho\rangle\langle\bar{B}_6\sigma_{\mu\nu}D_{\lambda\rho}B_6\rangle$			493		$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu h^{\lambda\rho}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	856		1718	
$\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u^\rho\rangle\langle\bar{B}_6\sigma_{\mu\lambda}D_{\nu\rho}B_6\rangle$			494		$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu h^{\lambda\rho}\gamma_5\gamma_\nu D_{\mu\lambda}B_{6\rho}^*\rangle$ + H.c.	857		1719	
$\langle f_+{}^{\mu\nu}u_\mu\rangle\langle\bar{B}_6 u^\lambda\sigma_{\nu\lambda}B_6\rangle$			495	I	$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu h^{\lambda\rho}\gamma_5\gamma_\nu D_{\mu\nu}B_{6\mu}^*\rangle$ + H.c.	858		1720	
$\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_6 u_\mu\sigma_{\nu\lambda}B_6\rangle$			496	I	$\langle\bar{B}_{\bar{3}}u^\mu\gamma_5\gamma_\mu B_6^{*\nu}\nabla^\lambda f^T_{-\nu\lambda}\rangle$ + H.c.	859		1721	
$\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_6 u_\lambda\sigma_{\mu\nu}B_6\rangle$			497	I	$\langle\bar{B}_{\bar{3}}u^\mu\gamma_5\gamma^\nu B_{6\mu}^*\nabla^\lambda f^T_{-\nu\lambda}\rangle$ + H.c.	860		1722	

(Table continued)

TABLE VIII. (Continued)

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle \bar{B}_6 u^\rho\sigma_{\mu\nu}D_{\lambda\rho}B_6\rangle$			498	I	$\langle \bar{B}_{\bar{3}}u^\mu\gamma_5\gamma^\nu B_6^{*\lambda}\nabla_\nu f^T_{-\mu\lambda}\rangle$ + H.c.	861		1723	
$\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle \bar{B}_6 u^\rho\sigma_{\mu\lambda}D_{\nu\rho}B_6\rangle$			499	I	$\langle \bar{B}_{\bar{3}}u^\mu\gamma_5\gamma^\nu B_6^{*\lambda}\nabla_\mu h^T_{\nu\lambda}\rangle$ + H.c.	862		1724	
$\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle \bar{B}_6 u^\rho\sigma_{\mu\rho}D_{\nu\lambda}B_6\rangle$			500	I	$\langle \bar{B}_{\bar{3}}f_-{}^{\mu\nu}f_{-\mu}{}^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	863		1725	
$i\langle \bar{B}_6 f_+{}^{\mu\nu}f_{-\mu}{}^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	262	I	501	I	$\langle \bar{B}_{\bar{3}}f_-{}^{\mu\nu}f_{-\mu}{}^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			1726	
$i\langle \bar{B}_6 f_+{}^{\mu\nu}f_{-\mu}{}^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.	263	I	502	I	$\langle \bar{B}_{\bar{3}}f_-{}^{\mu\nu}f_-{}^{\lambda\rho}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			1727	
$i\langle \bar{B}_6 f_+{}^{\mu\nu}h_\mu{}^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	264	I	503	I	$\langle \bar{B}_{\bar{3}}f_-{}^{\mu\nu}h_\mu{}^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	864		1728	
$i\langle \bar{B}_6 f_+{}^{\mu\nu}h_\mu{}^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.	265	I	504	I	$\langle \bar{B}_{\bar{3}}f_-{}^{\mu\nu}h_\mu{}^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	865		1729	
$i\langle \bar{B}_6 f_+{}^{\mu\nu}h^{\lambda\rho}\gamma_5\gamma_\mu D_{\nu\lambda\rho}B_6\rangle$ + H.c.	266	I	505	I	$\langle \bar{B}_{\bar{3}}f_-{}^{\mu\nu}h^{\lambda\rho}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	866		1730	
$i\langle \bar{B}_6 f_+{}^{\mu\nu}\gamma_5\gamma_\mu D^\lambda B_6 f^T_{-\nu\lambda}\rangle$ + H.c.	267	I	506	I	$\langle \bar{B}_{\bar{3}}f_-{}^{\mu\nu}h^{\lambda\rho}\gamma_5\gamma_\mu D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.	867		1731	
$i\langle \bar{B}_6 f_+{}^{\mu\nu}\gamma_5\gamma^\lambda D_\mu B_6 f^T_{-\nu\lambda}\rangle$	268	I	507	I	$\langle \bar{B}_{\bar{3}}f_-{}^{\mu\nu}\gamma_5\gamma_\mu B_6^{*\lambda}f^T_{-\nu\lambda}\rangle$ + H.c.	868		1732	
$i\langle \bar{B}_6 f_+{}^{\mu\nu}\gamma_5\gamma^\lambda D_\mu B_6 h^T_{\nu\lambda}\rangle$	269	I	508	I	$\langle \bar{B}_{\bar{3}}f_-{}^{\mu\nu}\gamma_5\gamma_\mu B_6^{*\lambda}h^T_{\nu\lambda}\rangle$ + H.c.	869		1733	
$i\langle \bar{B}_6 \nabla^\mu f_{+\mu}{}^\nu u^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	270	I	509	I	$\langle \bar{B}_{\bar{3}}\nabla^\mu f_{-\mu}{}^\nu u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	870		1734	
$i\langle \bar{B}_6 \nabla^\mu f_{+\mu}{}^\nu u^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.	271	I	510	I	$\langle \bar{B}_{\bar{3}}\nabla^\mu f_{-\mu}{}^\nu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	871		1735	
$i\langle \bar{B}_6 \nabla^\mu f_+{}^{\nu\lambda}u_\mu\gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.	272	I	511	I	$\langle \bar{B}_{\bar{3}}\nabla^\mu f_-{}^{\nu\lambda}u_\nu\gamma_5\gamma_\mu B_{6\lambda}^*\rangle$ + H.c.	872		1736	
$i\langle \bar{B}_6 \nabla^\mu f_{+\mu}{}^\nu\gamma_5\gamma_\nu D^\lambda B_6 u^T_\lambda\rangle$	273	I	512	I	$\langle \bar{B}_{\bar{3}}h^{\mu\nu}f_{-\mu}{}^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	873		1737	
$i\langle \bar{B}_6 \nabla^\mu f_{+\mu}{}^\nu\gamma_5\gamma^\lambda D_\nu B_6 u^T_\lambda\rangle$	274	I	513	I	$\langle \bar{B}_{\bar{3}}h^{\mu\nu}h_\mu{}^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	874		1738	
$i\langle \bar{B}_6 \nabla^\mu f_+{}^{\nu\lambda}\gamma_5\gamma_\mu D_\nu B_6 u^T_\lambda\rangle$	275	I	514	I	$\langle \bar{B}_{\bar{3}}h^{\mu\nu}h_\mu{}^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	875		1739	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_6 f_{-\mu}{}^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$	276	I	515		$\langle \bar{B}_{\bar{3}}h^{\mu\nu}\gamma_5\gamma_\mu B_6^{*\lambda}h^T_{\nu\lambda}\rangle$ + H.c.	876		1740	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_6 f_{-\mu}{}^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$	277	I	516		$\langle \bar{B}_{\bar{3}}\nabla^\mu h^{\nu\lambda}u_\mu\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	877		1741	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_6 h_\mu{}^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$	278	I	517		$\langle u^\mu\nabla_\mu f_-{}^{\nu\lambda}\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1742	
$i\langle f_+{}^{\mu\nu}f_{-\mu}{}^\lambda\rangle\langle \bar{B}_6 \gamma_5\gamma_\nu D_\lambda B_6\rangle$			518	I	$\langle u^\mu\nabla^\nu f_{-\mu}{}^\lambda\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1743	
$i\langle f_+{}^{\mu\nu}f_{-\mu}{}^\lambda\rangle\langle \bar{B}_6 \gamma_5\gamma_\lambda D_\nu B_6\rangle$			519	I	$\langle u^\mu\nabla^\nu f_{-\nu}{}^\lambda\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\mu B_{6\lambda}^*\rangle$ + H.c.			1744	
$i\langle f_+{}^{\mu\nu}h_\mu{}^\lambda\rangle\langle \bar{B}_6 \gamma_5\gamma_\nu D_\lambda B_6\rangle$			520	I	$\langle u^\mu\nabla^\nu f_{-\nu}{}^\lambda\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\lambda B_{6\mu}^*\rangle$ + H.c.			1745	
$i\langle f_+{}^{\mu\nu}h_\mu{}^\lambda\rangle\langle \bar{B}_6 \gamma_5\gamma_\lambda D_\nu B_6\rangle$			521	I	$\langle u^\mu\nabla^\nu f_-{}^{\lambda\rho}\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			1746	
$i\langle f_+{}^{\mu\nu}h^{\lambda\rho}\rangle\langle \bar{B}_6 \gamma_5\gamma_\mu D_{\nu\lambda\rho}B_6\rangle$			522		$\langle u^\mu\nabla^\nu f_-{}^{\lambda\rho}\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\nu D_{\mu\lambda}B_{6\rho}^*\rangle$ + H.c.			1747	
$i\langle \nabla^\mu f_{+\mu}{}^\nu\rangle\langle \bar{B}_6 u^\lambda\gamma_5\gamma_\nu D_\lambda B_6\rangle$	279	I	523		$\langle u^\mu\nabla^\nu f_-{}^{\lambda\rho}\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\lambda D_{\mu\nu}B_{6\rho}^*\rangle$ + H.c.			1748	
$i\langle \nabla^\mu f_{+\mu}{}^\nu\rangle\langle \bar{B}_6 u^\lambda\gamma_5\gamma_\lambda D_\nu B_6\rangle$	280	I	524		$\langle u^\mu\nabla_\mu h^{\nu\lambda}\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1749	
$i\langle \nabla^\mu f_+{}^{\nu\lambda}\rangle\langle \bar{B}_6 u_\mu\gamma_5\gamma_\nu D_\lambda B_6\rangle$	281	I	525		$\langle u^\mu\nabla^\nu h^{\lambda\rho}\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}\rangle$ + H.c.			1750	
$i\langle \nabla^\mu f_{+\mu}{}^\nu u^\lambda\rangle\langle \bar{B}_6 \gamma_5\gamma_\nu D_\lambda B_6\rangle$			526	I	$\langle f_-{}^{\mu\nu}h_\mu{}^\lambda\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1751	
$i\langle \nabla^\mu f_{+\mu}{}^\nu u^\lambda\rangle\langle \bar{B}_6 \gamma_5\gamma_\lambda D_\nu B_6\rangle$			527	I	$\langle h^{\mu\nu}h_\mu{}^\lambda\rangle\langle \bar{B}_{\bar{3}}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1752	
$i\langle \nabla^\mu f_+{}^{\nu\lambda}u_\mu\rangle\langle \bar{B}_6 \gamma_5\gamma_\nu D_\lambda B_6\rangle$			528	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u_\mu u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	878		1753	
$ie^{\mu\nu\lambda\rho}\langle \bar{B}_6 f_{+\mu\nu}f_{-\lambda\rho}B_6\rangle$ + H.c.	282	I	529	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u_\mu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	879		1754	
$ie^{\mu\nu\lambda\rho}\langle \bar{B}_6 f_{+\mu\nu}f_{-\lambda}{}^\sigma D_{\rho\sigma}B_6\rangle$ + H.c.	283	I	530	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u_\mu\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	880		1755	
$ie^{\mu\nu\lambda\rho}\langle \bar{B}_6 f_{+\mu\nu}h_\lambda{}^\sigma D_{\rho\sigma}B_6\rangle$ + H.c.	284	I	531	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u_\mu\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	881		1756	
$\langle \bar{B}_6 \nabla^\mu\nabla_\mu f_+{}^{\nu\lambda}\sigma_{\nu\lambda}B_6\rangle$	285	I	532	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u_\lambda\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	882		1757	
$\langle \nabla^\mu\nabla_\mu f_+{}^{\nu\lambda}\rangle\langle \bar{B}_6 \sigma_{\nu\lambda}B_6\rangle$			533		$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u^\rho\gamma_5\gamma_\mu D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.	883		1758	
$\langle \bar{B}_6 f_+{}^{\mu\nu}f_{+\mu\nu}B_6\rangle$	286	I	534	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u^\rho\gamma_5\gamma_\mu D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.	884		1759	
$\langle \bar{B}_6 f_+{}^{\mu\nu}f_{+\mu}{}^\lambda D_{\nu\lambda}B_6\rangle$	287	I	535	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u^\rho\gamma_5\gamma_\mu D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.	885		1760	
$i\langle \bar{B}_6 f_+{}^{\mu\nu}f_{+\mu}{}^\lambda\sigma_{\nu\lambda}B_6\rangle$	288	I	536	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u^\rho\gamma_5\gamma_\nu D_{\mu\rho}B_{6\nu}^*\rangle$ + H.c.	886		1761	
$i\langle \bar{B}_6 f_+{}^{\mu\nu}f_+{}^{\lambda\rho}\sigma_{\mu\lambda}D_{\nu\rho}B_6\rangle$	289	I	537	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda u^\rho\gamma_5\gamma_\rho D_{\mu\lambda}B_{6\nu}^*\rangle$ + H.c.	887		1762	
$\langle \bar{B}_6 f_+{}^{\mu\nu}B_6 f^T_{+\mu\nu}\rangle$	290	I	538	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u_\mu\gamma_5\gamma_\nu B_6^{*\lambda}u^T_\lambda\rangle$ + H.c.	888		1763	
$\langle \bar{B}_6 f_+{}^{\mu\nu}D_\mu{}^\lambda B_6 f^T_{+\nu\lambda}\rangle$	291	I	539	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u_\mu\gamma_5\gamma^\lambda B_{6\nu}^*u^T_\lambda\rangle$ + H.c.	889		1764	
$\langle \bar{B}_6 B_6\rangle\langle f_+{}^{\mu\nu}f_{+\mu\nu}\rangle$	292	I	540	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda\gamma_5\gamma_\mu B_{6\nu}^*u^T_\lambda\rangle$ + H.c.	890		1765	
$\langle \bar{B}_6 D^{\mu\nu}B_6\rangle\langle f_{+\mu}{}^\lambda f_{+\nu\lambda}\rangle$	293	I	541	I	$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda\gamma_5\gamma_\mu B_{6\lambda}^*u^T_\nu\rangle$ + H.c.	891		1766	
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_6 f_{+\mu\nu}B_6\rangle$			542		$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda\gamma_5\gamma_\lambda B_{6\mu}^*u^T_\nu\rangle$ + H.c.	892		1767	
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_6 f_{+\mu}{}^\lambda D_{\nu\lambda}B_6\rangle$			543		$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda\gamma_5\gamma_\mu D_{\nu\lambda}B_6^{*\rho}u^T_\rho\rangle$ + H.c.	893		1768	
$\langle f_+{}^{\mu\nu}\rangle\langle f_{+\mu\nu}\rangle\langle \bar{B}_6 B_6\rangle$			544		$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda\gamma_5\gamma_\mu D_\nu{}^\rho B_{6\lambda}^*u^T_\rho\rangle$ + H.c.	894		1769	
$\langle f_+{}^{\mu\nu}\rangle\langle f_{+\mu}{}^\lambda\rangle\langle \bar{B}_6 D_{\nu\lambda}B_6\rangle$			545		$i\langle \bar{B}_{\bar{3}}f_+{}^{\mu\nu}u^\lambda\gamma_5\gamma_\mu D_\lambda{}^\rho B_{6\nu}^*u^T_\rho\rangle$ + H.c.	895		1770	

(Table continued)

TABLE VIII. (Continued)

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$\langle\bar{B}_6 u^\mu u_\mu \chi_+ B_6\rangle$ + H.c.	294	I	546	I	$i\langle\bar{B}_{\bar{3}} f_+{}^{\mu\nu} u^\lambda \gamma_5\gamma_\lambda D_\mu{}^\rho B_{6\nu}^* u^T{}_\rho\rangle$ + H.c.	896		1771	
$\langle\bar{B}_6 u^\mu u^\nu \chi_+ D_{\mu\nu} B_6\rangle$ + H.c.	295	I	547	I	$i\langle\bar{B}_{\bar{3}} f_+{}^{\mu\nu} u^\lambda \gamma_5\gamma^\rho D_{\mu\lambda} B_{6\nu}^* u^T{}_\rho\rangle$ + H.c.	897		1772	
$i\langle\bar{B}_6 u^\mu u^\nu \chi_+ \sigma_{\mu\nu} B_6\rangle$ + H.c.	296	I	548	I	$i\langle\bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma_\mu B_{6\nu}^* u^{T\lambda} u^T{}_\lambda\rangle$ + H.c.			1773	
$\langle\bar{B}_6 u^\mu u_\mu B_6 \chi_+^T\rangle$			549	I	$i\langle\bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma_\mu B_6^{*\lambda} u^T{}_\nu u^T{}_\lambda\rangle$ + H.c.	898		1774	
$\langle\bar{B}_6 u^\mu u^\nu D_{\mu\nu} B_6 \chi_+^T\rangle$			550	I	$i\langle\bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma_\mu B_6^{*\lambda} u^T{}_\lambda u^T{}_\nu\rangle$ + H.c.			1775	
$i\langle\bar{B}_6 u^\mu u^\nu \sigma_{\mu\nu} B_6 \chi_+^T\rangle$	297	I	551	I	$i\langle\bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma^\lambda B_{6\mu}^* u^T{}_\nu u^T{}_\lambda\rangle$ + H.c.	899		1776	
$\langle\bar{B}_6 u^\mu \chi_+ u_\mu B_6\rangle$	298	I	552	I	$i\langle\bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma^\lambda B_{6\mu}^* u^T{}_\lambda u^T{}_\nu\rangle$ + H.c.			1777	
$\langle\bar{B}_6 u^\mu \chi_+ u^\nu D_{\mu\nu} B_6\rangle$	299	I	553	I	$i\langle\bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma_\mu D_\nu{}^\lambda B_6^{*\rho} u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.	900		1778	
$i\langle\bar{B}_6 u^\mu \chi_+ u^\nu \sigma_{\mu\nu} B_6\rangle$	300	I	554	I	$i\langle\bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma_\mu D_\nu{}^\lambda B_6^{*\rho} u^T{}_\rho u^T{}_\lambda\rangle$ + H.c.			1779	
$\langle\bar{B}_6 u^\mu \chi_+ B_6 u^T{}_\mu\rangle$ + H.c.	301	I	555	I	$i\langle\bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma_\mu D^{\lambda\rho} B_{6\nu}^* u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.			1780	
$\langle\bar{B}_6 u^\mu \chi_+ D_\mu{}^\nu B_6 u^T{}_\nu\rangle$ + H.c.	302	I	556	I	$i\langle\bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma^\lambda D_\mu{}^\rho B_{6\nu}^* u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.	901		1781	
$i\langle\bar{B}_6 u^\mu \chi_+ \sigma_\mu{}^\nu B_6 u^T{}_\nu\rangle$ + H.c.	303	I	557	I	$i\langle\bar{B}_{\bar{3}} f_+{}^{\mu\nu} \gamma_5\gamma^\lambda D_\mu{}^\rho B_{6\nu}^* u^T{}_\rho u^T{}_\lambda\rangle$ + H.c.			1782	
$\langle\bar{B}_6 B_6\rangle\langle u^\mu u_\mu \chi_+\rangle$	304	I	558	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_{+\mu}{}^\nu u^\lambda \gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	902		1783	
$\langle\bar{B}_6 D^{\mu\nu} B_6\rangle\langle u_\mu u_\nu \chi_+\rangle$	305	I	559	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_{+\mu}{}^\nu u^\lambda \gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	903		1784	
$i\langle\bar{B}_6 \sigma^{\mu\nu} B_6\rangle\langle u_\mu u_\nu \chi_+\rangle$			560	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} u_\mu \gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	904		1785	
$\langle u^\mu u_\mu\rangle\langle\bar{B}_6 \chi_+ B_6\rangle$			561	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} u_\nu \gamma_5\gamma_\mu B_{6\lambda}^*\rangle$ + H.c.	905		1786	
$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 \chi_+ D_{\mu\nu} B_6\rangle$			562	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} u_\nu \gamma_5\gamma_\lambda B_{6\mu}^*\rangle$ + H.c.	906		1787	
$\langle u^\mu \chi_+\rangle\langle\bar{B}_6 u_\mu B_6\rangle$			563	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} u^\rho \gamma_5\gamma_\mu D_{\nu\rho} B_{6\lambda}^*\rangle$ + H.c.			1788	
$\langle u^\mu \chi_+\rangle\langle\bar{B}_6 u^\nu D_{\mu\nu} B_6\rangle$			564	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} u^\rho \gamma_5\gamma_\nu D_{\mu\lambda} B_{6\rho}^*\rangle$ + H.c.	907		1789	
$\langle\chi_+\rangle\langle\bar{B}_6 u^\mu u_\mu B_6\rangle$			565	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} u^\rho \gamma_5\gamma_\nu D_{\mu\rho} B_{6\lambda}^*\rangle$ + H.c.	908		1790	
$\langle\chi_+\rangle\langle\bar{B}_6 u^\mu u^\nu D_{\mu\nu} B_6\rangle$			566	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} u^\rho \gamma_5\gamma_\nu D_{\lambda\rho} B_{6\mu}^*\rangle$ + H.c.	909		1791	
$i\langle\chi_+\rangle\langle\bar{B}_6 u^\mu u^\nu \sigma_{\mu\nu} B_6\rangle$			567	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} u^\rho \gamma_5\gamma_\rho D_{\mu\nu} B_{6\lambda}^*\rangle$ + H.c.			1792	
$\langle\chi_+\rangle\langle\bar{B}_6 u^\mu B_6 u^T{}_\mu\rangle$			568	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_{+\mu}{}^\nu \gamma_5\gamma_\nu B_6^{*\lambda} u^T{}_\lambda\rangle$ + H.c.	910		1793	
$\langle\chi_+\rangle\langle\bar{B}_6 u^\mu D_\mu{}^\nu B_6 u^T{}_\nu\rangle$			569	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_{+\mu}{}^\nu \gamma_5\gamma^\lambda B_{6\nu}^* u^T{}_\lambda\rangle$ + H.c.	911		1794	
$\langle\bar{B}_6 u^\mu \nabla^\nu \chi_+ \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	306	I	570	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} \gamma_5\gamma_\mu B_{6\nu}^* u^T{}_\lambda\rangle$ + H.c.			1795	
$\langle\bar{B}_6 u^\mu \nabla^\nu \chi_+ \gamma_5\gamma_\nu D_\mu B_6\rangle$ + H.c.	307	I	571	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} \gamma_5\gamma_\nu B_{6\mu}^* u^T{}_\lambda\rangle$ + H.c.			1796	
$\langle\bar{B}_6 f_-{}^{\mu\nu} \chi_+ \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	308	I	572	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} \gamma_5\gamma_\nu B_{6\lambda}^* u^T{}_\mu\rangle$ + H.c.			1797	
$\langle\bar{B}_6 \nabla^\mu \nabla_\mu \chi_+ B_6\rangle$	309	I	573	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} \gamma_5\gamma_\nu D_{\mu\lambda} B_6^{*\rho} u^T{}_\rho\rangle$ + H.c.	912		1798	
$\langle\nabla^\mu \nabla_\mu \chi_+\rangle\langle\bar{B}_6 B_6\rangle$	310	I	574	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} \gamma_5\gamma_\nu D_\mu{}^\rho B_{6\lambda}^* u^T{}_\rho\rangle$ + H.c.			1799	
$\langle\bar{B}_6 f_+{}^{\mu\nu} \chi_+ \sigma_{\mu\nu} B_6\rangle$ + H.c.	311	I	575	I	$i\langle\bar{B}_{\bar{3}} u^\mu f_+{}^{\nu\lambda} \gamma_5\gamma_\nu D_\lambda{}^\rho B_{6\mu}^* u^T{}_\rho\rangle$ + H.c.			1800	
$\langle\bar{B}_6 f_+{}^{\mu\nu} \sigma_{\mu\nu} B_6 \chi_+^T\rangle$	312	I	576	I	$i\langle\bar{B}_{\bar{3}} u^\mu u_\mu f_+{}^{\nu\lambda} \gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1801	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 \chi_+ \sigma_{\mu\nu} B_6\rangle$	313	I	577		$i\langle\bar{B}_{\bar{3}} u^\mu u^\nu f_{+\mu}{}^\lambda \gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1802	
$\langle f_+{}^{\mu\nu}\rangle\langle\chi_+\rangle\langle\bar{B}_6 \sigma_{\mu\nu} B_6\rangle$	314	I	578		$i\langle\bar{B}_{\bar{3}} u^\mu u^\nu f_{+\mu}{}^\lambda \gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			1803	
$\langle f_+{}^{\mu\nu} \chi_+\rangle\langle\bar{B}_6 \sigma_{\mu\nu} B_6\rangle$	315	I	579	I	$i\langle\bar{B}_{\bar{3}} u^\mu u^\nu f_{+\nu}{}^\lambda \gamma_5\gamma_\mu B_{6\lambda}^*\rangle$ + H.c.			1804	
$\langle\chi_+\rangle\langle\bar{B}_6 f_+{}^{\mu\nu} \sigma_{\mu\nu} B_6\rangle$			580	I	$i\langle\bar{B}_{\bar{3}} u^\mu u^\nu f_{+\nu}{}^\lambda \gamma_5\gamma_\lambda B_{6\mu}^*\rangle$ + H.c.			1805	
$\langle\bar{B}_6 \chi_+^2 B_6\rangle$	316	I	581	I	$i\langle\bar{B}_{\bar{3}} u^\mu u^\nu f_+{}^{\lambda\rho} \gamma_5\gamma_\lambda D_{\mu\nu} B_{6\rho}^*\rangle$ + H.c.			1806	
$\langle\bar{B}_6 \chi_+ B_6 \chi_+^T\rangle$	317	I	582	I	$i\langle\bar{B}_{\bar{3}} u^\mu u^\nu f_+{}^{\lambda\rho} \gamma_5\gamma_\lambda D_{\mu\rho} B_{6\nu}^*\rangle$ + H.c.			1807	
$\langle\bar{B}_6 B_6\rangle\langle\chi_+^2\rangle$	318	I	583	I	$i\langle\bar{B}_{\bar{3}} u^\mu u^\nu f_+{}^{\lambda\rho} \gamma_5\gamma_\lambda D_{\nu\rho} B_{6\mu}^*\rangle$ + H.c.			1808	
$\langle\chi_+\rangle\langle\bar{B}_6 \chi_+ B_6\rangle$			584	I	$i\langle\bar{B}_{\bar{3}} \gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle f_{+\mu\nu} u^\lambda u_\lambda\rangle$ + H.c.			1809	
$\langle\chi_+\rangle\langle\chi_+\rangle\langle\bar{B}_6 B_6\rangle$			585	I	$i\langle\bar{B}_{\bar{3}} \gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle f_{+\mu}{}^\lambda u_\nu u_\lambda\rangle$ + H.c.			1810	
$i\langle\bar{B}_6 u^\mu u^\nu \chi_- \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	319	I	586	I	$i\langle\bar{B}_{\bar{3}} \gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle f_{+\mu}{}^\lambda u_\lambda u_\nu\rangle$ + H.c.			1811	
$i\langle\bar{B}_6 u^\mu u^\nu \chi_- \gamma_5\gamma_\nu D_\mu B_6\rangle$ + H.c.			587	I	$i\langle\bar{B}_{\bar{3}} \gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle f_{+\nu}{}^\lambda u_\mu u_\lambda\rangle$ + H.c.			1812	
$i\langle\bar{B}_6 u^\mu u^\nu \gamma_5\gamma_\mu D_\nu B_6 \chi_-^T\rangle$ + H.c.	320	I	588	I	$i\langle\bar{B}_{\bar{3}} \gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle f_{+\nu}{}^\lambda u_\lambda u_\mu\rangle$ + H.c.			1813	
$i\langle\bar{B}_6 u^\mu \chi_- u^\nu \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	321	I	589	I	$i\langle\bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^{\nu\lambda} B_6^{*\rho}\rangle\langle f_{+\mu\nu} u_\lambda u_\rho\rangle$ + H.c.			1814	
$i\langle\bar{B}_6 u^\mu \chi_- \gamma_5\gamma_\mu D^\nu B_6 u^T{}_\nu\rangle$ + H.c.	322	I	590	I	$i\langle\bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^{\nu\lambda} B_6^{*\rho}\rangle\langle f_{+\mu\nu} u_\rho u_\lambda\rangle$ + H.c.			1815	
$i\langle\bar{B}_6 u^\mu \chi_- \gamma_5\gamma^\nu D_\mu B_6 u^T{}_\nu\rangle$ + H.c.	323	I	591	I	$i\langle\bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^{\nu\lambda} B_6^{*\rho}\rangle\langle f_{+\mu\rho} u_\nu u_\lambda\rangle$ + H.c.			1816	
$i\langle\bar{B}_6 \gamma_5\gamma^\nu D^\mu B_6\rangle\langle u_\mu u_\nu \chi_-\rangle$ + H.c.			592	I	$i\langle\bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^{\nu\lambda} B_6^{*\rho}\rangle\langle f_{+\nu\rho} u_\mu u_\lambda\rangle$ + H.c.			1817	
$i\langle\chi_-\rangle\langle\bar{B}_6 u^\mu u^\nu \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.			593	I	$i\langle\bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^{\nu\lambda} B_6^{*\rho}\rangle\langle f_{+\nu\rho} u_\lambda u_\mu\rangle$ + H.c.			1818	

(Table continued)

TABLE VIII. *(Continued)*

O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$	O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$
$i\langle\bar{B}_6 u^\mu\nabla_\mu\chi_- B_6\rangle$ + H.c.	324	I	594	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u_\mu u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1819	
$i\langle\bar{B}_6 u^\mu\nabla^\nu\chi_- D_{\mu\nu}B_6\rangle$	325	I	595	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u_\mu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			1820	
$\langle\bar{B}_6 u^\mu\nabla^\nu\chi_-\sigma_{\mu\nu}B_6\rangle$ + H.c.	326	I	596	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u^\lambda u_\mu\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1821	
$i\langle\bar{B}_6 u^\mu B_6\nabla_\mu\chi_-^T\rangle$	327	I	597	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u^\lambda u_\mu\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			1822	
$\langle\bar{B}_6 f_-{}^{\mu\nu}\chi_-\sigma_{\mu\nu}B_6\rangle$ + H.c.	328	I	598	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u^\lambda u_\lambda\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1823	
$i\langle\bar{B}_6 B_6\rangle\langle u^\mu\nabla_\mu\chi_-\rangle$	329	I	599	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u^\lambda u^\rho\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			1824	
$i\langle\bar{B}_6 D^{\mu\nu}B_6\rangle\langle u_\mu\nabla_\nu\chi_-\rangle$			600	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u^\lambda u^\rho\gamma_5\gamma_\mu D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.			1825	
$i\langle\nabla^\mu\chi_-\rangle\langle\bar{B}_6 u_\mu B_6\rangle$			601	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u^\lambda u^\rho\gamma_5\gamma_\mu D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			1826	
$\langle\bar{B}_6 f_+{}^{\mu\nu}\chi_-\gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.	330	I	602	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u^\lambda u^\rho\gamma_5\gamma_\mu D_{\mu\rho}B_{6\nu}^*\rangle$ + H.c.			1827	
$\langle\bar{B}_6 f_+{}^{\mu\nu}\gamma_5\gamma_\mu D_\nu B_6\chi_-^T\rangle$	331	I	603	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u^\lambda u^\rho\gamma_5\gamma_\rho D_{\mu\lambda}B_{6\nu}^*\rangle$ + H.c.			1828	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6\chi_-\gamma_5\gamma_\mu D_\nu B_6\rangle$	332	I	604		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u_\mu\gamma_5\gamma_\nu B_6^{*\lambda}u^T_\lambda\rangle$ + H.c.			1829	
$\langle f_+{}^{\mu\nu}\rangle\langle\chi_-\rangle\langle\bar{B}_6\gamma_5\gamma_\mu D_\nu B_6\rangle$	333	I	605		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u_\mu\gamma_5\gamma^\lambda B_{6\nu}^* u^T_\lambda\rangle$ + H.c.			1830	
$\langle f_+{}^{\mu\nu}\chi_-\rangle\langle\bar{B}_6\gamma_5\gamma_\mu D_\nu B_6\rangle$	334	I	606	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u^\lambda\gamma_5\gamma_\mu D_{\nu\lambda}B_6^{*\rho}u^T_\rho\rangle$ + H.c.			1831	
$\langle\chi_-\rangle\langle\bar{B}_6 f_+{}^{\mu\nu}\gamma_5\gamma_\mu D_\nu B_6\rangle$			607	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{\bar3}u^\lambda\gamma_5\gamma_\lambda D_\mu{}^\rho B_{6\nu}^* u^T_\rho\rangle$ + H.c.			1832	
$\langle\bar{B}_6\chi_-^2 B_6\rangle$	335	I	608	I	$i\langle f_+{}^{\mu\nu}\rangle\langle u_\mu u^\lambda\rangle\langle\bar{B}_{\bar3}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1833	
$\langle\bar{B}_6\chi_- B_6\chi_-^T\rangle$	336	I	609	I	$i\langle f_+{}^{\mu\nu}\rangle\langle u_\mu u^\lambda\rangle\langle\bar{B}_{\bar3}\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			1834	
$\langle\chi_-\rangle\langle\bar{B}_6\chi_- B_6\rangle$	337	I	610	I	$i\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u_\lambda\rangle\langle\bar{B}_{\bar3}\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1835	
$\langle\chi_-\rangle\langle\chi_-\rangle\langle\bar{B}_6 B_6\rangle$			611	I	$i\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u^\rho\rangle\langle\bar{B}_{\bar3}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			1836	
$\langle D^\mu D_\mu F_L{}^{\nu\lambda}\rangle\langle\bar{B}_6\sigma_{\nu\lambda}B_6\rangle$ + P.	338	I			$i\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u^\rho\rangle\langle\bar{B}_{\bar3}\gamma_5\gamma_\mu D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			1837	
$\langle\bar{B}_6 B_6\rangle\langle F_L{}^{\mu\nu}F_{L\mu\nu}\rangle$ + P.	339	I	612	I	$i\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u^\rho\rangle\langle\bar{B}_{\bar3}\gamma_5\gamma_\lambda D_{\mu\rho}B_{6\nu}^*\rangle$ + H.c.			1838	
$\langle\bar{B}_6 D^{\mu\nu}B_6\rangle\langle F_{L\mu}{}^\lambda F_{L\nu\lambda}\rangle$ + P.	340	I	613	I	$i\langle f_+{}^{\mu\nu}u_\mu\rangle\langle\bar{B}_{\bar3}u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1839	
$\langle F_L{}^{\mu\nu}\rangle\langle F_{L\mu\nu}\rangle\langle\bar{B}_6 B_6\rangle$ + P.	341	I			$i\langle f_+{}^{\mu\nu}u_\mu\rangle\langle\bar{B}_{\bar3}u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			1840	
$\langle F_L{}^{\mu\nu}\rangle\langle F_{L\mu}{}^\lambda\rangle\langle\bar{B}_6 D_{\nu\lambda}B_6\rangle$ + P.	342	I			$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_{\bar3}u_\mu\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1841	
$\langle\bar{B}_6 B_6\rangle\langle\chi\chi^\dagger\rangle$	343	I	614	I	$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_{\bar3}u_\mu\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			1842	
$\langle\bar{B}_6\det\chi B_6\rangle$ + H.c.	344	I			$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_{\bar3}u_\lambda\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1843	
$\langle\bar{B}_6^{*\mu}u_\mu u^\nu u_\nu u^\lambda B_{6\lambda}^*\rangle$	345	I	615	I	$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_{\bar3}u^\rho\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			1844	
$\langle\bar{B}_6^{*\mu}u_\mu u^\nu u^\lambda u_\nu B_{6\lambda}^*\rangle$ + H.c.	346	I	616	I	$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_{\bar3}u^\rho\gamma_5\gamma_\mu D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.			1845	
$\langle\bar{B}_6^{*\mu}u_\mu u^\nu u^\lambda u_\lambda B_{6\nu}^*\rangle$ + H.c.			617	I	$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_{\bar3}u^\rho\gamma_5\gamma_\mu D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			1846	
$\langle\bar{B}_6^{*\mu}u^\nu u_\mu u_\nu u^\lambda B_{6\lambda}^*\rangle$	347	I	618	I	$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_{\bar3}u^\rho\gamma_5\gamma_\mu D_{\mu\rho}B_{6\nu}^*\rangle$ + H.c.			1847	
$\langle\bar{B}_6^{*\mu}u^\nu u_\mu u^\lambda u_\lambda B_{6\nu}^*\rangle$ + H.c.	348	I	619	I	$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_{\bar3}u^\rho\gamma_5\gamma_\rho D_{\mu\lambda}B_{6\nu}^*\rangle$ + H.c.			1848	
$\langle\bar{B}_6^{*\mu}u^\nu u_\nu u^\lambda u_\lambda B_{6\mu}^*\rangle$	349	I	620	I	$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}f_-\mu{}^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.	913		1849	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda u_\mu u_\nu B_{6\lambda}^*\rangle$ + H.c.			621		$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}f_-\mu{}^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.	914		1850	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda u_\mu u_\lambda B_{6\nu}^*\rangle$ + H.c.			622		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}f_-^{\lambda\rho}\sigma_{\mu\nu}D_\lambda B_{6\rho}^*\rangle$ + H.c.	915		1851	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda u_\nu u_\lambda B_{6\mu}^*\rangle$	350	I	623		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}f_-^{\lambda\rho}\sigma_{\mu\lambda}D_\nu B_{6\rho}^*\rangle$ + H.c.	916		1852	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda u_\lambda u_\mu B_{6\nu}^*\rangle$ + H.c.			624		$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}h_\mu{}^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.	917		1853	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda u_\lambda u_\nu B_{6\mu}^*\rangle$ + H.c.			625		$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}h_\mu{}^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.	918		1854	
$\langle\bar{B}_6^{*\mu}u_\mu u^\nu u^\lambda u^\rho D_{\nu\lambda}B_{6\rho}^*\rangle$	351	I	626	I	$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}h_\mu{}^\lambda D_{\mu\lambda}B_{6\nu}^*\rangle$ + H.c.	919		1855	
$\langle\bar{B}_6^{*\mu}u_\mu u^\nu u^\lambda u^\rho D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.	352	I	627	I	$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}h^{\lambda\rho}\sigma_{\mu\nu}D_\lambda B_{6\rho}^*\rangle$ + H.c.	920		1856	
$\langle\bar{B}_6^{*\mu}u_\mu u^\nu u^\lambda u^\rho D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			628	I	$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}h^{\lambda\rho}\sigma_{\mu\lambda}D_\nu B_{6\rho}^*\rangle$ + H.c.	921		1857	
$\langle\bar{B}_6^{*\mu}u^\nu u_\mu u^\lambda u^\rho D_{\nu\rho}B_{6\lambda}^*\rangle$	353	I	629	I	$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}D_\nu B_6^{*\lambda}f^T_{-\nu\lambda}\rangle$ + H.c.	922		1858	
$\langle\bar{B}_6^{*\mu}u^\nu u_\mu u^\lambda u^\rho D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.	354	I	630	I	$i\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}D^\lambda B_{6\mu}^* f^T_{-\lambda\nu}\rangle$ + H.c.	923		1859	
$\langle\bar{B}_6^{*\mu}u^\nu u_\nu u^\lambda u^\rho D_{\lambda\rho}B_{6\mu}^*\rangle$ + H.c.	355		631		$\langle\bar{B}_{\bar3}f_+{}^{\mu\nu}\sigma_\mu{}^\lambda D_\nu B_6^{*\rho}f^T_{-\lambda\rho}\rangle$ + H.c.	924		1860	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda u_\mu u^\rho D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			632	I	$i\langle\bar{B}_{\bar3}\nabla^\mu f_{+\mu}{}^\nu u^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.	925		1861	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda u_\mu u^\rho D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.			633		$i\langle\bar{B}_{\bar3}\nabla^\mu f_{+\mu}{}^\nu u^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.	926		1862	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda u_\nu u^\rho D_{\lambda\rho}B_{6\mu}^*\rangle$ + H.c.	356		634		$i\langle\bar{B}_{\bar3}\nabla^\mu f_{+\mu}{}^\nu D_\nu B_6^{*\lambda}u^T_\lambda\rangle$ + H.c.	927		1863	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda u_\lambda u^\rho D_{\nu\rho}B_{6\mu}^*\rangle$ + H.c.			635	I	$i\langle\bar{B}_{\bar3}\nabla^\mu f_{+\mu}{}^\nu D^\lambda B_{6\nu}^* u^T_\lambda\rangle$ + H.c.	928		1864	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda u^\rho u_\mu D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			636		$i\langle\bar{B}_{\bar3}u^\mu\nabla_\mu f_+{}^{\nu\lambda}D_\nu B_{6\lambda}^*\rangle$ + H.c.	929		1865	

(Table continued)

TABLE VIII. (Continued)

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$\langle\bar B_6^{*\mu}u^\nu u^\lambda u^\rho u_\nu D_{\lambda\rho}B_{6\mu}^*\rangle$ + H.c.			637		$i\langle\bar B_{\bar3}u^\mu\nabla^\nu f_{+\mu}{}^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.	930		1866	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda u^\rho u^\sigma D_{\nu\lambda\rho\sigma}B_{6\mu}^*\rangle$	357	I	638		$i\langle\bar B_{\bar3}u^\mu\nabla^\nu f_{+\nu}{}^\lambda D_\mu B_{6\lambda}^*\rangle$ + H.c.	931		1867	
$i\langle\bar B_6^{*\mu}u_\mu u^\nu u^\lambda u^\rho\sigma_{\nu\lambda}B_{6\rho}^*\rangle$	358		639		$i\langle\bar B_{\bar3}u^\mu\nabla^\nu f_{+\nu}{}^\lambda D_\lambda B_{6\mu}^*\rangle$ + H.c.	932		1868	
$i\langle\bar B_6^{*\mu}u_\mu u^\nu u^\lambda u^\rho\sigma_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.			640		$\langle\bar B_{\bar3}u^\mu\nabla^\nu f_+{}^{\lambda\rho}\sigma_{\mu\nu}D_\lambda B_{6\rho}^*\rangle$ + H.c.	933		1869	
$i\langle\bar B_6^{*\mu}u^\nu u_\mu u^\lambda u^\rho\sigma_{\nu\rho}B_{6\lambda}^*\rangle$	359		641		$\langle\bar B_{\bar3}u^\mu\nabla^\nu f_+{}^{\lambda\rho}\sigma_{\mu\lambda}D_\nu B_{6\rho}^*\rangle$ + H.c.	934		1870	
$i\langle\bar B_6^{*\mu}u^\nu u^\lambda u_\mu u^\rho\sigma_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			642		$\langle\bar B_{\bar3}u^\mu\nabla^\nu f_+{}^{\lambda\rho}\sigma_{\nu\lambda}D_\mu B_{6\rho}^*\rangle$ + H.c.	935		1871	
$\langle\bar B_6^{*\mu}u_\mu u^\nu u_\nu B_6^{*\lambda}u^T_\lambda\rangle$ + H.c.	360	I	643	I	$i\langle\bar B_{\bar3}f_-{}^{\mu\nu}f_{+\mu}{}^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.	936		1872	
$\langle\bar B_6^{*\mu}u_\mu u^\nu u^\lambda B_{6\nu}^*u^T_\lambda\rangle$ + H.c.	361	I	644	I	$i\langle\bar B_{\bar3}f_-{}^{\mu\nu}f_{+\mu}{}^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.	937		1873	
$\langle\bar B_6^{*\mu}u_\mu u^\nu u^\lambda B_{6\lambda}^*u^T_\nu\rangle$	362		645	I	$i\langle\bar B_{\bar3}D^\mu B_6^{*\nu}\rangle\langle f_{+\mu}{}^\lambda f_{-\nu\lambda}\rangle$ + H.c.	938		1874	
$\langle\bar B_6^{*\mu}u^\nu u_\mu u^\lambda B_6^{*\lambda}u^T_\lambda\rangle$ + H.c.			646		$i\langle\bar B_{\bar3}D^\mu B_6^{*\nu}\rangle\langle f_{+\nu}{}^\lambda f_{-\mu\lambda}\rangle$ + H.c.	939		1875	
$\langle\bar B_6^{*\mu}u^\nu u_\nu u_\mu B_6^{*\lambda}u^T_\lambda\rangle$ + H.c.			647		$i\langle\bar B_{\bar3}D^\mu B_6^{*\nu}\rangle\langle f_{+\mu}{}^\lambda h_{\nu\lambda}\rangle$ + H.c.			1876	
$\langle\bar B_6^{*\mu}u^\nu u_\nu u^\lambda B_6^{*\lambda}u^T_\lambda\rangle$ + H.c.			648		$i\langle\bar B_{\bar3}D^\mu B_6^{*\nu}\rangle\langle f_{+\nu}{}^\lambda h_{\mu\lambda}\rangle$ + H.c.			1877	
$\langle\bar B_6^{*\mu}u^\nu u_\nu u^\lambda B_{6\mu}^*u^T_\lambda\rangle$ + H.c.	363	I	649	I	$i\langle\bar B_{\bar3}D^\mu B_6^{*\nu}\rangle\langle\nabla^\lambda f_{+\mu\lambda}u_\nu\rangle$ + H.c.	940		1878	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda u_\mu B_{6\nu}^*u^T_\lambda\rangle$ + H.c.			650		$i\langle\bar B_{\bar3}D^\mu B_6^{*\nu}\rangle\langle\nabla^\lambda f_{+\nu\lambda}u_\mu\rangle$ + H.c.	941		1879	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda u_\nu B_{6\mu}^*u^T_\lambda\rangle$	364		651		$i\langle\bar B_{\bar3}D^{\mu\nu\lambda}B_6^{*\rho}\rangle\langle f_{+\mu\rho}h_{\nu\lambda}\rangle$ + H.c.			1880	
$\langle\bar B_6^{*\mu}u_\mu u^\nu u^\lambda D_{\nu\lambda}B_6^{*\rho}u^T_\rho\rangle$ + H.c.	365	I	652	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar B_{\bar3}f_{-\mu}{}^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.			1881	
$\langle\bar B_6^{*\mu}u_\mu u^\nu u^\lambda D_\nu{}^\rho B_{6\lambda}^*u^T_\rho\rangle$	366	I	653	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar B_{\bar3}f_{-\mu}{}^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.			1882	
$\langle\bar B_6^{*\mu}u_\mu u^\nu u^\lambda D_\lambda{}^\rho B_{6\nu}^*u^T_\rho\rangle$ + H.c.	367	I	654	I	$\langle f_+{}^{\mu\nu}\rangle\langle\bar B_{\bar3}f_-{}^{\lambda\rho}\sigma_{\mu\lambda}D_\nu B_{6\rho}^*\rangle$ + H.c.	942		1883	
$\langle\bar B_6^{*\mu}u^\nu u_\mu u^\lambda D_{\nu\lambda}B_6^{*\rho}u^T_\rho\rangle$ + H.c.			655	I	$\langle f_+{}^{\mu\nu}f_-{}^{\lambda\rho}\rangle\langle\bar B_{\bar3}\sigma_{\mu\nu}D_\lambda B_{6\rho}^*\rangle$ + H.c.			1884	
$\langle\bar B_6^{*\mu}u^\nu u_\mu u^\lambda D_\lambda{}^\rho B_{6\nu}^*u^T_\rho\rangle$ + H.c.			656		$\langle f_+{}^{\mu\nu}f_-{}^{\lambda\rho}\rangle\langle\bar B_{\bar3}\sigma_{\mu\lambda}D_\nu B_{6\rho}^*\rangle$ + H.c.			1885	
$\langle\bar B_6^{*\mu}u^\nu u_\nu u^\lambda D_\lambda{}^\rho B_{6\mu}^*u^T_\rho\rangle$ + H.c.	368	I	657	I	$\langle f_+{}^{\mu\nu}h^{\lambda\rho}\rangle\langle\bar B_{\bar3}\sigma_{\mu\nu}D_\lambda B_{6\rho}^*\rangle$ + H.c.			1886	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda u_\mu D_{\nu\lambda}B_6^{*\rho}u^T_\rho\rangle$ + H.c.			658		$\langle f_+{}^{\mu\nu}h^{\lambda\rho}\rangle\langle\bar B_{\bar3}\sigma_{\mu\lambda}D_\nu B_{6\rho}^*\rangle$ + H.c.			1887	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda u_\mu D_\lambda{}^\rho B_{6\nu}^*u^T_\rho\rangle$ + H.c.			659		$i\langle\nabla^\mu f_{+\mu}{}^\nu\rangle\langle\bar B_{\bar3}u^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.			1888	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda u_\nu D_\lambda{}^\rho B_{6\mu}^*u^T_\rho\rangle$	369	I	660	I	$i\langle\nabla^\mu f_{+\mu}{}^\nu\rangle\langle\bar B_{\bar3}u^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.			1889	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda u^\rho D_{\nu\lambda}B_{6\mu}^*u^T_\rho\rangle$ + H.c.	370		661	I	$i\langle\bar B_{\bar3}\nabla^\mu\nabla_\mu f_+{}^{\nu\lambda}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	943		1890	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda u^\rho D_{\nu\rho}B_{6\mu}^*u^T_\lambda\rangle$ + H.c.			662		$i\langle\nabla^\mu\nabla_\mu f_+{}^{\nu\lambda}\rangle\langle\bar B_{\bar3}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1891	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda u^\rho D_{\nu\lambda}{}^\sigma B_{6\mu}^*u^T_\sigma\rangle$	371		663		$\langle\bar B_{\bar3}f_+{}^{\mu\nu}f_{+\mu}{}^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	944		1892	
$i\langle\bar B_6^{*\mu}u_\mu u^\nu u^\lambda\sigma_{\nu\lambda}B_6^{*\rho}u^T_\rho\rangle$ + H.c.	372		664		$\langle\bar B_{\bar3}f_+{}^{\mu\nu}f_{+\mu}{}^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	945		1893	
$i\langle\bar B_6^{*\mu}u^\nu u_\mu u^\lambda\sigma_{\nu\lambda}B_6^{*\rho}u^T_\rho\rangle$ + H.c.			665		$\langle\bar B_{\bar3}f_+{}^{\mu\nu}f_+{}^{\lambda\rho}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	946		1894	
$\langle\bar B_6^{*\mu}u_\mu u^\nu B_{6\nu}^*u^{T\lambda}u^T_\lambda\rangle$ + H.c.			666	I	$\langle\bar B_{\bar3}f_+{}^{\mu\nu}\gamma_5\gamma_\mu B_6^{*\lambda}f^T_{+\nu\lambda}\rangle$ + H.c.	947		1895	
$\langle\bar B_6^{*\mu}u_\mu u^\nu B_6^{*\lambda}u^T_\nu u^T_\lambda\rangle$ + H.c.	373		667	I	$\langle\bar B_{\bar3}f_+{}^{\mu\nu}\gamma_5\gamma_\mu D_\nu{}^\lambda B_6^{*\rho}f^T_{+\lambda\rho}\rangle$ + H.c.	948		1896	
$\langle\bar B_6^{*\mu}u_\mu u^\nu B_6^{*\lambda}u^T_\lambda u^T_\nu\rangle$ + H.c.			668	I	$\langle f_+{}^{\mu\nu}\rangle\langle\bar B_{\bar3}f_{+\mu}{}^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	949		1897	
$\langle\bar B_6^{*\mu}u^\nu u_\mu B_{6\nu}^*u^{T\lambda}u^T_\lambda\rangle$ + H.c.			669		$\langle f_+{}^{\mu\nu}\rangle\langle\bar B_{\bar3}f_{+\mu}{}^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	950		1898	
$\langle\bar B_6^{*\mu}u^\nu u_\mu B_6^{*\lambda}u^T_\nu u^T_\lambda\rangle$ + H.c.			670		$\langle f_+{}^{\mu\nu}\rangle\langle\bar B_{\bar3}f_+{}^{\lambda\rho}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	951		1899	
$\langle\bar B_6^{*\mu}u^\nu u_\nu B_{6\mu}^*u^{T\lambda}u^T_\lambda\rangle$ + H.c.			671		$\langle f_+{}^{\mu\nu}\rangle\langle\bar B_{\bar3}f_+{}^{\lambda\rho}\gamma_5\gamma_\lambda D_{\mu\rho}B_{6\nu}^*\rangle$ + H.c.	952		1900	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda B_{6\mu}^*u^T_\nu u^T_\lambda\rangle$	374		672		$\langle f_+{}^{\mu\nu}\rangle\langle f_{+\mu}{}^\lambda\rangle\langle\bar B_{\bar3}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1901	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda B_{6\mu}^*u^T_\lambda u^T_\nu\rangle$ + H.c.			673		$\langle f_+{}^{\mu\nu}\rangle\langle f_+{}^{\lambda\rho}\rangle\langle\bar B_{\bar3}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			1902	
$\langle\bar B_6^{*\mu}u_\mu u^\nu D_\nu{}^\rho B_6^{*\rho}u^T_\lambda u^T_\rho\rangle$ + H.c.	375		674	I	$\langle f_+{}^{\mu\nu}f_{+\mu}{}^\lambda\rangle\langle\bar B_{\bar3}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1903	
$\langle\bar B_6^{*\mu}u_\mu u^\nu D_\nu B_6^{*\rho}u^T_\rho u^T_\lambda\rangle$ + H.c.			675	I	$\langle f_+{}^{\mu\nu}f_+{}^{\lambda\rho}\rangle\langle\bar B_{\bar3}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			1904	
$\langle\bar B_6^{*\mu}u_\mu u^\nu D^{\lambda\rho}B_{6\nu}^*u^T_\lambda u^T_\rho\rangle$ + H.c.			676	I	$\langle\bar B_{\bar3}u^\mu u^\nu\chi_+\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	953		1905	
$\langle\bar B_6^{*\mu}u^\nu u_\mu D_\nu{}^\lambda B_6^{*\rho}u^T_\lambda u^T_\rho\rangle$ + H.c.			677		$\langle\bar B_{\bar3}u^\mu u^\nu\chi_+\gamma_5\gamma_\nu B_{6\mu}^*\rangle$ + H.c.	954		1906	
$\langle\bar B_6^{*\mu}u^\nu u_\mu D^{\lambda\rho}B_{6\nu}^*u^T_\lambda u^T_\rho\rangle$ + H.c.			678		$\langle\bar B_{\bar3}u^\mu u^\nu\gamma_5\gamma_\mu B_{6\nu}^*\chi_+^T\rangle$ + H.c.	955		1907	
$\langle\bar B_6^{*\mu}u^\nu u_\nu D^{\lambda\rho}B_{6\mu}^*u^T_\lambda u^T_\rho\rangle$ + H.c.			679		$\langle\bar B_{\bar3}u^\mu u^\nu\gamma_5\gamma_\nu B_{6\mu}^*\chi_+^T\rangle$ + H.c.			1908	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda D_\nu{}^\rho B_{6\mu}^*u^T_\lambda u^T_\rho\rangle$ + H.c.	376		680		$\langle\bar B_{\bar3}u^\mu\chi_+ u^\nu\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	956		1909	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda D_\nu B_{6\mu}^*u^T_\rho u^T_\lambda\rangle$ + H.c.			681		$\langle\bar B_{\bar3}u^\mu\chi_+ u^\nu\gamma_5\gamma_\nu B_{6\mu}^*\rangle$ + H.c.	957		1910	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda D_{\nu\lambda}{}^{\rho\sigma}B_{6\mu}^*u^T_\rho u^T_\sigma\rangle$ + H.c.			682		$\langle\bar B_{\bar3}u^\mu\chi_+\gamma_5\gamma_\mu B_6^{*\nu}u^T_\nu\rangle$ + H.c.	958		1911	

(Table continued)

TABLE VIII. (Continued)

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$i\langle\bar B_6^{*\mu}u_\mu u^\nu\sigma_\nu{}^\lambda B_6^{*\rho}u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.	377		683		$\langle\bar B_{\bar 3}u^\mu\chi_+\gamma_5\gamma^\nu B_{6\mu}^* u^T{}_\nu\rangle$ + H.c.	959		1912	
$i\langle\bar B_6^{*\mu}u_\mu u^\nu\sigma_\nu{}^\lambda B_6^{*\rho}u^T{}_\rho u^T{}_\lambda\rangle$ + H.c.			684		$\langle\bar B_{\bar 3}u^\mu\gamma_5\gamma_\mu B_6^{*\nu}u^T{}_\nu\chi_+^T\rangle$ + H.c.	960		1913	
$i\langle\bar B_6^{*\mu}u^\nu u_\mu\sigma_\nu{}^\lambda B_6^{*\rho}u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.			685		$\langle\bar B_{\bar 3}u^\mu\gamma_5\gamma^\nu B_{6\mu}^* u^T{}_\nu\chi_+^T\rangle$ + H.c.			1914	
$\langle\bar B_6^{*\mu}u_\mu B_6^{*\nu}\rangle\langle u_\nu u^\lambda u_\lambda\rangle$ + H.c.			686	I	$\langle\bar B_{\bar 3}\chi_+ u^\mu u^\nu\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1915	
$\langle\bar B_6^{*\mu}u^\nu B_{6\mu}^*\rangle\langle u_\nu u^\lambda u_\lambda\rangle$ + H.c.			687	I	$\langle\bar B_{\bar 3}\chi_+ u^\mu u^\nu\gamma_5\gamma_\nu B_{6\mu}^*\rangle$ + H.c.			1916	
$\langle\bar B_6^{*\mu}u^\nu B_6^{*\lambda}\rangle\langle u_\mu u_\nu u_\lambda\rangle$ + H.c.			688		$\langle\bar B_{\bar 3}\gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle u_\mu u_\nu\chi_+\rangle$ + H.c.			1917	
$\langle\bar B_6^{*\mu}u^\nu B_6^{*\lambda}\rangle\langle u_\mu u_\lambda u_\nu\rangle$ + H.c.			689		$\langle\bar B_{\bar 3}\gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle u_\nu u_\mu\chi_+\rangle$ + H.c.			1918	
$\langle\bar B_6^{*\mu}u_\mu D^{\nu\lambda}B_6^{*\rho}\rangle\langle u_\nu u_\lambda u_\rho\rangle$ + H.c.			690	I	$\langle u^\mu u^\nu\rangle\langle\bar B_{\bar 3}\chi_+\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1919	
$\langle\bar B_6^{*\mu}u^\nu D_\nu B_{6\mu}^*\rangle\langle u_\lambda u^\rho u_\rho\rangle$ + H.c.			691	I	$\langle u^\mu\chi_+\rangle\langle\bar B_{\bar 3}u^\nu\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1920	
$\langle\bar B_6^{*\mu}u^\nu D_\nu B_6^{*\rho}\rangle\langle u_\mu u_\lambda u_\rho\rangle$ + H.c.			692		$\langle u^\mu\chi_+\rangle\langle\bar B_{\bar 3}u^\nu\gamma_5\gamma_\nu B_{6\mu}^*\rangle$ + H.c.			1921	
$\langle\bar B_6^{*\mu}u^\nu D_\nu{}^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\rho u_\lambda\rangle$ + H.c.			693		$\langle\chi_+\rangle\langle\bar B_{\bar 3}u^\mu u^\nu\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1922	
$\langle\bar B_6^{*\mu}u^\nu D^{\lambda\rho}B_{6\mu}^*\rangle\langle u_\nu u_\lambda u_\rho\rangle$ + H.c.			694		$\langle\chi_+\rangle\langle\bar B_{\bar 3}u^\mu u^\nu\gamma_5\gamma_\nu B_{6\mu}^*\rangle$ + H.c.			1923	
$\langle\bar B_6^{*\mu}u^\nu D_\nu{}^{\lambda\rho\sigma}B_{6\mu}^*\rangle\langle u_\lambda u_\rho u_\sigma\rangle$ + H.c.			695		$\langle\chi_+\rangle\langle\bar B_{\bar 3}u^\mu\gamma_5\gamma_\mu B_6^{*\nu}u^T{}_\nu\rangle$ + H.c.			1924	
$\langle\bar B_6^{*\mu}B_{6\mu}^*\rangle\langle u^\nu u_\nu\rangle\langle u^\lambda u_\lambda\rangle$ + H.c.			696	I	$\langle\bar B_{\bar 3}u^\mu\nabla^\nu\chi_+ D_\mu B_{6\nu}^*\rangle$ + H.c.	961		1925	
$\langle\bar B_6^{*\mu}B_{6\mu}^*\rangle\langle u^\nu u^\lambda\rangle\langle u_\nu u_\lambda\rangle$ + H.c.			697	I	$\langle\bar B_{\bar 3}u^\mu\nabla^\nu\chi_+ D_\nu B_{6\mu}^*\rangle$ + H.c.	962		1926	
$\langle\bar B_6^{*\mu}B_6^{*\nu}\rangle\langle u_\mu u_\nu\rangle\langle u^\lambda u_\lambda\rangle$ + H.c.			698	I	$\langle\bar B_{\bar 3}\chi_+ f_-^{\mu\nu}D_\mu B_{6\nu}^*\rangle$ + H.c.	963		1927	
$\langle\bar B_6^{*\mu}B_6^{*\nu}\rangle\langle u_\mu u^\lambda\rangle\langle u_\nu u_\lambda\rangle$ + H.c.			699		$\langle\bar B_{\bar 3}\chi_+ h^{\mu\nu}D_\mu B_{6\nu}^*\rangle$ + H.c.	964		1928	
$\langle\bar B_6^{*\mu}B_{6\mu}^*\rangle\langle u^\nu u_\nu u^\lambda u_\lambda\rangle$ + H.c.			700	I	$\langle\bar B_{\bar 3}D^\mu B_6^{*\nu}\rangle\langle u_\mu\nabla_\nu\chi_+\rangle$ + H.c.			1929	
$\langle\bar B_6^{*\mu}B_6^{*\nu}\rangle\langle u_\mu u_\nu u^\lambda u_\lambda\rangle$ + H.c.			701		$\langle\bar B_{\bar 3}D^\mu B_6^{*\nu}\rangle\langle u_\nu\nabla_\mu\chi_+\rangle$ + H.c.			1930	
$\langle\bar B_6^{*\mu}B_6^{*\nu}\rangle\langle u_\mu u^\lambda u_\nu u_\lambda\rangle$ + H.c.			702		$i\langle\bar B_{\bar 3}f_+^{\mu\nu}\chi_+\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	965		1931	
$\langle\bar B_6^{*\mu}D^{\nu\lambda}B_{6\mu}^*\rangle\langle u_\nu u_\lambda\rangle\langle u^\rho u_\rho\rangle$ + H.c.			703	I	$i\langle\bar B_{\bar 3}f_+^{\mu\nu}\gamma_5\gamma_\mu B_{6\nu}^*\chi_+^T\rangle$ + H.c.	966		1932	
$\langle\bar B_6^{*\mu}D^{\nu\lambda}B_{6\mu}^*\rangle\langle u_\nu u^\rho\rangle\langle u_\lambda u_\rho\rangle$ + H.c.			704	I	$i\langle\bar B_{\bar 3}\chi_+ f_+^{\mu\nu}\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	967		1933	
$\langle\bar B_6^{*\mu}D^{\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu u_\nu\rangle\langle u_\lambda u_\rho\rangle$ + H.c.			705	I	$i\langle f_+^{\mu\nu}\rangle\langle\bar B_{\bar 3}\chi_+\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	968		1934	
$\langle\bar B_6^{*\mu}D^{\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu u_\rho\rangle\langle u_\nu u_\lambda\rangle$ + H.c.			706		$i\langle f_+^{\mu\nu}\rangle\langle\chi_+\rangle\langle\bar B_{\bar 3}\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	969		1935	
$\langle\bar B_6^{*\mu}D^{\nu\lambda}B_{6\mu}^*\rangle\langle u_\nu u_\lambda u^\rho u_\rho\rangle$ + H.c.			707	I	$i\langle f_+^{\mu\nu}\chi_+\rangle\langle\bar B_{\bar 3}\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	970		1936	
$\langle\bar B_6^{*\mu}D^{\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu u_\nu u_\lambda u_\rho\rangle$ + H.c.			708		$i\langle\chi_+\rangle\langle\bar B_{\bar 3}f_+^{\mu\nu}\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1937	
$\langle\bar B_6^{*\mu}D^{\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu u_\nu u_\rho u_\lambda\rangle$ + H.c.			709		$i\langle\bar B_{\bar 3}u^\mu u^\nu\chi_- D_\mu B_{6\nu}^*\rangle$ + H.c.	971		1938	
$\langle\bar B_6^{*\mu}D^{\nu\lambda\rho\sigma}B_{6\mu}^*\rangle\langle u_\nu u_\lambda\rangle\langle u_\rho u_\sigma\rangle$ + H.c.			710		$i\langle\bar B_{\bar 3}u^\mu u^\nu\chi_- D_\nu B_{6\mu}^*\rangle$ + H.c.	972		1939	
$i\langle\bar B_6^{*\mu}\sigma^{\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu u_\nu u_\lambda u_\rho\rangle$ + H.c.			711		$i\langle\bar B_{\bar 3}u^\mu u^\nu D_\mu B_{6\nu}^*\chi_-^T\rangle$ + H.c.	973		1940	
$i\langle u^\mu u^\nu\rangle\langle\bar B_{6\mu}^* u^\rho\sigma_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			712		$i\langle\bar B_{\bar 3}u^\mu u^\nu D_\nu B_{6\mu}^*\chi_-^T\rangle$ + H.c.			1941	
$\langle u^\mu u_\mu\rangle\langle\bar B_6^{*\nu}u_\nu B_6^{*\lambda}u^T{}_\lambda\rangle$ + H.c.			713	I	$i\langle\bar B_{\bar 3}u^\mu\chi_- u^\nu D_\mu B_{6\nu}^*\rangle$ + H.c.	974		1942	
$\langle u^\mu u_\mu\rangle\langle\bar B_6^{*\nu}u^\lambda B_{6\nu}^* u^T{}_\lambda\rangle$ + H.c.			714		$i\langle\bar B_{\bar 3}u^\mu\chi_- u^\nu D_\nu B_{6\mu}^*\rangle$ + H.c.	975		1943	
$\langle u^\mu u_\mu\rangle\langle\bar B_6^{*\nu}u^\lambda D_\lambda{}^\rho B_{6\nu}^* u^T{}_\rho\rangle$ + H.c.			715		$i\langle\bar B_{\bar 3}u^\mu\chi_- D_\mu B_6^{*\nu}u^T{}_\nu\rangle$ + H.c.	976		1944	
$\langle u^\mu u^\nu\rangle\langle\bar B_{6\mu}^* u^\lambda D_{\nu\lambda}B_6^{*\rho}u^T{}_\rho\rangle$ + H.c.			716		$i\langle\bar B_{\bar 3}u^\mu\chi_- D^\nu B_{6\mu}^*u^T{}_\nu\rangle$ + H.c.	977		1945	
$i\langle u^\mu u^\nu\rangle\langle\bar B_{6\mu}^* u^\lambda\sigma_{\nu\lambda}B_6^{*\rho}u^T{}_\rho\rangle$ + H.c.			717		$i\langle\bar B_{\bar 3}u^\mu D_\mu B_6^{*\nu}u^T{}_\nu\chi_-^T\rangle$ + H.c.	978		1946	
$\langle\bar B_6^{*\mu}u_\mu u^\nu f_-^{\lambda\rho}\gamma_5\gamma_\nu D_\lambda B_{6\rho}^*\rangle$ + H.c.	378	I	718	I	$i\langle\bar B_{\bar 3}u^\mu D^\nu B_{6\mu}^*u^T{}_\nu\chi_-^T\rangle$ + H.c.			1947	
$\langle\bar B_6^{*\mu}u_\mu u^\nu f_-^{\lambda\rho}\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.	379	I	719	I	$i\langle\bar B_{\bar 3}\chi_- u^\mu u^\nu D_\mu B_{6\nu}^*\rangle$ + H.c.			1948	
$\langle\bar B_6^{*\mu}u_\mu u^\nu f_-^{\lambda\rho}\gamma_5\gamma_\lambda D_\rho B_{6\nu}^*\rangle$ + H.c.	380	I	720		$i\langle\bar B_{\bar 3}\chi_- u^\mu u^\nu D_\nu B_{6\mu}^*\rangle$ + H.c.			1949	
$\langle\bar B_6^{*\mu}u^\nu u_\mu f_-^{\lambda\rho}\gamma_5\gamma_\nu D_\lambda B_{6\rho}^*\rangle$ + H.c.			721	I	$i\langle\bar B_{\bar 3}D^\mu B_6^{*\nu}\rangle\langle u_\mu u_\nu\chi_-\rangle$ + H.c.			1950	
$\langle\bar B_6^{*\mu}u^\nu u_\mu f_-^{\lambda\rho}\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.	381	I	722	I	$i\langle\bar B_{\bar 3}D^\mu B_6^{*\nu}\rangle\langle u_\nu u_\mu\chi_-\rangle$ + H.c.			1951	
$\langle\bar B_6^{*\mu}u^\nu u_\mu f_-^{\lambda\rho}\gamma_5\gamma_\lambda D_\rho B_{6\nu}^*\rangle$ + H.c.			723		$i\langle u^\mu u^\nu\rangle\langle\bar B_{\bar 3}\chi_- D_\mu B_{6\nu}^*\rangle$ + H.c.			1952	
$\langle\bar B_6^{*\mu}u^\nu u_\nu f_-^{\lambda\rho}\gamma_5\gamma_\lambda D_\rho B_{6\mu}^*\rangle$ + H.c.			724		$i\langle u^\mu\chi_-\rangle\langle\bar B_{\bar 3}u^\nu D_\mu B_{6\nu}^*\rangle$ + H.c.			1953	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda f_{-\mu}{}^\rho\gamma_5\gamma_\lambda D_\rho B_{6\nu}^*\rangle$ + H.c.	382	I	725		$i\langle u^\mu\chi_-\rangle\langle\bar B_{\bar 3}u^\nu D_\nu B_{6\mu}^*\rangle$ + H.c.			1954	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda f_{-\mu}{}^\rho\gamma_5\gamma_\nu D_\lambda B_{6\rho}^*\rangle$ + H.c.	383	I	726	I	$i\langle\chi_-\rangle\langle\bar B_{\bar 3}u^\mu u^\nu D_\mu B_{6\nu}^*\rangle$ + H.c.			1955	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda f_{-\mu}{}^\rho\gamma_5\gamma_\nu D_\rho B_{6\lambda}^*\rangle$ + H.c.			727		$i\langle\chi_-\rangle\langle\bar B_{\bar 3}u^\mu u^\nu D_\nu B_{6\mu}^*\rangle$ + H.c.			1956	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda f_{-\mu}{}^\rho\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.			728	I	$i\langle\chi_-\rangle\langle\bar B_{\bar 3}u^\mu D_\mu B_6^{*\nu}u^T{}_\nu\rangle$ + H.c.			1957	
$\langle\bar B_6^{*\mu}u^\nu u^\lambda f_{-\mu}{}^\rho\gamma_5\gamma_\rho D_\nu B_{6\lambda}^*\rangle$ + H.c.	384	I	729		$i\langle\bar B_{\bar 3}u^\mu\nabla^\nu\chi_-\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	979		1958	

(Table continued)

TABLE VIII. *(Continued)*

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda f_{-\mu}{}^\rho\gamma_5\gamma_\rho D_\lambda B_{6\nu}^*\rangle$ + H.c.			730		$i\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu\chi_-\gamma_5\gamma_\nu B_{6\mu}^*\rangle$ + H.c.	980		1959	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda f_{-\nu}{}^\rho\gamma_5\gamma_\lambda D_\rho B_{6\mu}^*\rangle$ + H.c.			731		$i\langle\bar{B}_{\bar{3}}u^\mu\gamma_5\gamma_\mu B_6^{*\nu}\nabla_\nu\chi_-^T\rangle$ + H.c.	981		1960	
$\langle\bar{B}_6^{*\mu}u_\mu u^\nu h^{\lambda\rho}\gamma_5\gamma_\nu D_\lambda B_{6\rho}^*\rangle$ + H.c.	385	I	732	I	$i\langle\bar{B}_{\bar{3}}u^\mu\gamma_5\gamma^\nu B_{6\mu}^*\nabla_\nu\chi_-^T\rangle$ + H.c.	982		1961	
$\langle\bar{B}_6^{*\mu}u_\mu u^\nu h^{\lambda\rho}\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.	386		733	I	$i\langle\bar{B}_{\bar{3}}f_-^{\mu\nu}\chi_-\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	983		1962	
$\langle\bar{B}_6^{*\mu}u_\mu u^\nu h^{\lambda\rho}\gamma_5\gamma_\lambda D_\rho B_{6\nu}^*\rangle$ + H.c.	387	I	734	I	$i\langle\bar{B}_{\bar{3}}f_-^{\mu\nu}\gamma_5\gamma_\mu B_{6\nu}^*\chi_-^T\rangle$ + H.c.	984		1963	
$\langle\bar{B}_6^{*\mu}u^\nu u_\mu h^{\lambda\rho}\gamma_5\gamma_\nu D_\lambda B_{6\rho}^*\rangle$ + H.c.			735	I	$i\langle\bar{B}_{\bar{3}}h^{\mu\nu}\chi_-\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	985		1964	
$\langle\bar{B}_6^{*\mu}u^\nu u_\mu h^{\lambda\rho}\gamma_5\gamma_\nu D_\rho B_{6\lambda}^*\rangle$ + H.c.			736	I	$i\langle\bar{B}_{\bar{3}}h^{\mu\nu}\gamma_5\gamma_\mu B_{6\nu}^*\chi_-^T\rangle$ + H.c.	986		1965	
$\langle\bar{B}_6^{*\mu}u^\nu u_\mu h^{\lambda\rho}\gamma_5\gamma_\lambda D_\rho B_{6\nu}^*\rangle$ + H.c.			737		$i\langle\bar{B}_{\bar{3}}\chi_-f_-^{\mu\nu}\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	987		1966	
$\langle\bar{B}_6^{*\mu}u^\nu u_\nu h^{\lambda\rho}\gamma_5\gamma_\lambda D_\rho B_{6\mu}^*\rangle$ + H.c.			738		$i\langle\bar{B}_{\bar{3}}\chi_-h^{\mu\nu}\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	988		1967	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda h_\mu{}^\rho\gamma_5\gamma_\nu D_\rho B_{6\lambda}^*\rangle$ + H.c.	388		739		$i\langle\bar{B}_{\bar{3}}\nabla^\mu\chi_-u^\nu\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	989		1968	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda h_\mu{}^\rho\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.	389		740		$i\langle\bar{B}_{\bar{3}}\nabla^\mu\chi_-u^\nu\gamma_5\gamma_\nu B_{6\mu}^*\rangle$ + H.c.	990		1969	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda h_\mu{}^\rho\gamma_5\gamma_\nu D_\rho B_{6\lambda}^*\rangle$ + H.c.			741		$i\langle u^\mu\nabla^\nu\chi_-\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	991		1970	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda h_\mu{}^\rho\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.			742		$i\langle u^\mu\nabla^\nu\chi_-\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\nu B_{6\mu}^*\rangle$ + H.c.	992		1971	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda h_\mu{}^\rho\gamma_5\gamma_\rho D_\nu B_{6\lambda}^*\rangle$ + H.c.			743		$i\langle f_-^{\mu\nu}\chi_-\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	993		1972	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda h_\mu{}^\rho\gamma_5\gamma_\rho D_\nu B_{6\lambda}^*\rangle$ + H.c.			744		$i\langle h^{\mu\nu}\chi_-\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.	994		1973	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda h_\nu{}^\rho\gamma_5\gamma_\lambda D_\rho B_{6\mu}^*\rangle$ + H.c.	390		745		$i\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}f_-^{\mu\nu}\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1974	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda h_\nu{}^\rho\gamma_5\gamma_\rho D_\lambda B_{6\mu}^*\rangle$ + H.c.			746		$i\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}h^{\mu\nu}\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1975	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda h^{\rho\sigma}\gamma_5\gamma_\nu D_{\lambda\rho\sigma}B_{6\mu}^*\rangle$ + H.c.			747		$i\langle\nabla^\mu\chi_-\rangle\langle\bar{B}_{\bar{3}}u^\nu\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1976	
$\langle\bar{B}_6^{*\mu}u_\mu u^\nu\gamma_5\gamma^\lambda D_\nu B_6^{*\rho}f_{-\lambda\rho}^T\rangle$ + H.c.	391		748	I	$i\langle\nabla^\mu\chi_-\rangle\langle\bar{B}_{\bar{3}}u^\nu\gamma_5\gamma_\nu B_{6\mu}^*\rangle$ + H.c.			1977	
$\langle\bar{B}_6^{*\mu}u^\nu u_\mu\gamma_5\gamma^\lambda D_\nu B_6^{*\rho}f_{-\lambda\rho}^T\rangle$ + H.c.			749		$\langle\bar{B}_{\bar{3}}f_+^{\mu\nu}\chi_-D_\mu B_{6\nu}^*\rangle$ + H.c.	995		1978	
$\langle\bar{B}_6^{*\mu}u_\mu f_-^{\nu\lambda}u^\rho\gamma_5\gamma_\nu D_\rho B_{6\lambda}^*\rangle$ + H.c.	392		750		$\langle\bar{B}_{\bar{3}}f_+^{\mu\nu}D_\mu B_{6\nu}^*\chi_-^T\rangle$ + H.c.	996		1979	
$\langle\bar{B}_6^{*\mu}u^\nu f_{-\mu}{}^\lambda u^\rho\gamma_5\gamma_\lambda D_\rho B_{6\nu}^*\rangle$ + H.c.			751		$\langle\bar{B}_{\bar{3}}D^\mu B_6^{*\nu}\rangle\langle f_{+\mu\nu}\chi_-\rangle$ + H.c.	997		1980	
$\langle\bar{B}_6^{*\mu}u_\mu f_-^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_6^{*\rho}u^T{}_\rho\rangle$ + H.c.	393		752	I	$\langle f_+^{\mu\nu}\rangle\langle\bar{B}_{\bar{3}}\chi_-D_\mu B_{6\nu}^*\rangle$ + H.c.	998		1981	
$\langle\bar{B}_6^{*\mu}u_\mu f_-^{\nu\lambda}\gamma_5\gamma_\nu D^\rho B_{6\lambda}^*u^T{}_\rho\rangle$ + H.c.	394		753	I	$\langle f_+^{\mu\nu}\rangle\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}D_\mu B_{6\nu}^*\rangle$ + H.c.	999		1982	
$\langle\bar{B}_6^{*\mu}u_\mu f_-^{\nu\lambda}\gamma_5\gamma^\rho D_\nu B_{6\lambda}^*u^T{}_\rho\rangle$ + H.c.	395		754	I	$\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}f_+^{\mu\nu}D_\mu B_{6\nu}^*\rangle$ + H.c.			1983	
$\langle\bar{B}_6^{*\mu}u^\nu f_{-\mu}{}^\lambda\gamma_5\gamma_\nu D_\lambda B_6^{*\rho}u^T{}_\rho\rangle$ + H.c.	396		755	I	$i\langle D^\mu D_\mu F_L^{\nu\lambda}\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + P.C.H.	1000	I		
$\langle\bar{B}_6^{*\mu}u^\nu f_{-\mu}{}^\lambda\gamma_5\gamma_\nu D^\rho B_{6\lambda}^*u^T{}_\rho\rangle$ + H.c.			756	I	$\langle F_L^{\mu\nu}F_{L\mu}{}^\lambda\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + P.C.H.	1001		1984	
$\langle\bar{B}_6^{*\mu}u^\nu f_{-\mu}{}^\lambda\gamma_5\gamma_\lambda D_\nu B_6^{*\rho}u^T{}_\rho\rangle$ + H.c.	397		757		$\langle F_L^{\mu\nu}F_L^{\lambda\rho}\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + P.C.H.	1002		1985	
$\langle\bar{B}_6^{*\mu}u^\nu f_{-\mu}{}^\lambda\gamma_5\gamma_\lambda D^\rho B_{6\nu}^*u^T{}_\rho\rangle$ + H.c.			758		$\langle F_L^{\mu\nu}\rangle\langle F_{L\mu}{}^\lambda\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + P.C.H.	1003			
$\langle\bar{B}_6^{*\mu}u^\nu f_{-\mu}{}^\lambda\gamma_5\gamma^\rho D_\nu B_{6\lambda}^*u^T{}_\rho\rangle$ + H.c.			759		$\langle F_L^{\mu\nu}\rangle\langle F_L^{\lambda\rho}\rangle\langle\bar{B}_{\bar{3}}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + P.C.H.	1004			
$\langle\bar{B}_6^{*\mu}u^\nu f_{-\mu}{}^\lambda\gamma_5\gamma^\rho D_\lambda B_{6\nu}^*u^T{}_\rho\rangle$ + H.c.			760		$\langle\bar{B}_6 u^\mu u_\mu u^\nu u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	1005		1986	
$\langle\bar{B}_6^{*\mu}u^\nu f_{-\nu}{}^\lambda\gamma_5\gamma_\lambda D^\rho B_{6\mu}^*u^T{}_\rho\rangle$ + H.c.	398		761		$\langle\bar{B}_6 u^\mu u_\mu u^\nu u^\lambda\gamma_5\gamma_\nu B_{6\nu}^*\rangle$ + H.c.	1006		1987	
$\langle\bar{B}_6^{*\mu}u^\nu f_{-\nu}{}^\lambda\gamma_5\gamma^\rho D_\lambda B_{6\mu}^*u^T{}_\rho\rangle$ + H.c.	399		762		$\langle\bar{B}_6 u^\mu u^\nu u_\mu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	1007		1988	
$\langle\bar{B}_6^{*\mu}u^\nu f_-^{\lambda\rho}\gamma_5\gamma_\nu D_\lambda B_{6\mu}^*u^T{}_\rho\rangle$ + H.c.			763		$\langle\bar{B}_6 u^\mu u^\nu u_\mu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	1008		1989	
$\langle\bar{B}_6^{*\mu}u^\nu f_-^{\lambda\rho}\gamma_5\gamma_\lambda D_\nu B_{6\mu}^*u^T{}_\rho\rangle$ + H.c.			764		$\langle\bar{B}_6 u^\mu u^\nu u_\nu u^\lambda\gamma_5\gamma_\mu B_{6\lambda}^*\rangle$ + H.c.			1990	
$\langle\bar{B}_6^{*\mu}u^\nu f_-^{\lambda\rho}\gamma_5\gamma_\lambda D_\rho B_{6\mu}^*u^T{}_\nu\rangle$ + H.c.			765		$\langle\bar{B}_6 u^\mu u^\nu u_\nu u^\lambda\gamma_5\gamma_\mu B_{6\mu}^*\rangle$ + H.c.			1991	
$\langle\bar{B}_6^{*\mu}u_\mu h^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_6^{*\rho}u^T{}_\rho\rangle$ + H.c.	400		766		$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u_\mu\gamma_5\gamma_\nu B_{6\nu}^*\rangle$ + H.c.			1992	
$\langle\bar{B}_6^{*\mu}u_\mu h^{\nu\lambda}\gamma_5\gamma_\nu D^\rho B_{6\lambda}^*u^T{}_\rho\rangle$ + H.c.	401		767		$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u_\mu\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			1993	
$\langle\bar{B}_6^{*\mu}u_\mu h^{\nu\lambda}\gamma_5\gamma^\rho D_\nu B_{6\lambda}^*u^T{}_\rho\rangle$ + H.c.	402		768		$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u_\nu\gamma_5\gamma_\mu B_{6\lambda}^*\rangle$ + H.c.	1009		1994	
$\langle\bar{B}_6^{*\mu}u^\nu h_\mu{}^\lambda\gamma_5\gamma_\nu D_\lambda B_6^{*\rho}u^T{}_\rho\rangle$ + H.c.			769		$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u_\nu\gamma_5\gamma_\lambda B_{6\mu}^*\rangle$ + H.c.			1995	
$\langle\bar{B}_6^{*\mu}u^\nu h_\nu{}^\lambda\gamma_5\gamma^\rho D_\lambda B_{6\mu}^*u^T{}_\rho\rangle$ + H.c.	403		770		$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u_\lambda\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			1996	
$\langle\bar{B}_6^{*\mu}u^\nu h^{\lambda\rho}\gamma_5\gamma_\nu D_\lambda B_{6\mu}^*u^T{}_\rho\rangle$ + H.c.	404		771		$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u_\lambda\gamma_5\gamma_\nu B_{6\mu}^*\rangle$ + H.c.			1997	
$\langle\bar{B}_6^{*\mu}u^\nu h^{\lambda\rho}\gamma_5\gamma_\nu D_\lambda{}^\sigma B_{6\mu}^*u^T{}_\sigma\rangle$ + H.c.	405		772		$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u^\rho\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	1010		1998	
$\langle\bar{B}_6^{*\mu}\gamma_5\gamma^\nu D^\lambda B_{6\mu}^*\rangle\langle u_\nu u^\rho f_{-\lambda\rho}\rangle$ + H.c.			773	I	$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u^\rho\gamma_5\gamma_\nu D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.	1011		1999	
$\langle\bar{B}_6^{*\mu}\gamma_5\gamma^\nu D^\lambda B_{6\mu}^*\rangle\langle u_\lambda u^\rho f_{-\nu\rho}\rangle$ + H.c.			774	I	$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u^\rho\gamma_5\gamma_\lambda D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			2000	
$\langle\bar{B}_6^{*\mu}\gamma_5\gamma^\nu D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\nu f_{-\lambda\rho}\rangle$ + H.c.			775		$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u^\rho\gamma_5\gamma_\nu D_{\mu\lambda}B_{6\rho}^*\rangle$ + H.c.	1012		2001	
$\langle\bar{B}_6^{*\mu}\gamma_5\gamma^\nu D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\lambda f_{-\nu\rho}\rangle$ + H.c.			776		$\langle\bar{B}_6 u^\mu u^\nu u^\lambda u^\rho\gamma_5\gamma_\nu D_{\mu\rho}B_{6\lambda}^*\rangle$ + H.c.	1013		2002	

(Table continued)

TABLE VIII. (Continued)

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$\langle \bar{B}_6^{*\mu}\gamma_5\gamma^\nu D^\lambda B_6^{*\rho}\rangle\langle u_\nu u_\lambda f_{-\mu\rho}\rangle$ + H.c.			777		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda u^\rho \gamma_5\gamma_\nu D_{\lambda\rho}B_{6\mu}^*\rangle$ + H.c.	1014		2003	
$\langle \bar{B}_6^{*\mu}\gamma_5\gamma^\nu D^\lambda B_{6\mu}^*\rangle\langle u_\nu u^\rho h_{\lambda\rho}\rangle$ + H.c.			778		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda u^\rho \gamma_5\gamma_\nu D_{\mu\nu}B_{6\rho}^*\rangle$ + H.c.			2004	
$\langle \bar{B}_6^{*\mu}\gamma_5\gamma^\nu D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\nu h_{\lambda\rho}\rangle$ + H.c.			779	I	$\langle \bar{B}_6 u^\mu u^\nu u^\lambda u^\rho \gamma_5\gamma_\lambda D_{\mu\nu}B_{6\rho}^*\rangle$ + H.c.			2005	
$\langle \bar{B}_6^{*\mu}\gamma_5\gamma^\nu D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\lambda h_{\nu\rho}\rangle$ + H.c.			780		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda u^\rho \gamma_5\gamma_\lambda D_{\nu\rho}B_{6\mu}^*\rangle$ + H.c.			2006	
$\langle \bar{B}_6^{*\mu}\gamma_5\gamma^\nu D^\lambda B_6^{*\rho}\rangle\langle u_\nu u_\mu h_{\lambda\rho}\rangle$ + H.c.			781		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda u^\rho \gamma_5\gamma_\rho D_{\mu\nu}B_{6\lambda}^*\rangle$ + H.c.			2007	
$\langle u^\mu u^\nu\rangle\langle \bar{B}_{6\mu}^* f_-^{\ \lambda\rho}\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.			782	I	$\langle \bar{B}_6 u^\mu u^\nu u^\lambda u^\rho \gamma_5\gamma_\rho D_{\mu\lambda}B_{6\nu}^*\rangle$ + H.c.			2008	
$\langle u^\mu f_-^{\ \nu\lambda}\rangle\langle \bar{B}_{6\mu}^* u^\rho\gamma_5\gamma_\nu D_\lambda B_{6\rho}^*\rangle$ + H.c.			783	I	$\langle \bar{B}_6 u^\mu u^\nu u^\lambda u^\rho \gamma_5\gamma_\rho D_{\nu\lambda}B_{6\mu}^*\rangle$ + H.c.			2009	
$\langle u^\mu f_-^{\ \nu\lambda}\rangle\langle \bar{B}_{6\mu}^* u^\rho\gamma_5\gamma_\nu D_\rho B_{6\lambda}^*\rangle$ + H.c.			784	I	$\langle \bar{B}_6 u^\mu u_\mu u^\nu\gamma_5\gamma_\nu B_6^{*\lambda}u^T_{\ \lambda}\rangle$ + H.c.	1015		2010	
$\langle u^\mu f_-^{\ \nu\lambda}\rangle\langle \bar{B}_{6\mu}^* u^\rho\gamma_5\gamma_\nu D_\rho B_{6\lambda}^*\rangle$ + H.c.			785		$\langle \bar{B}_6 u^\mu u_\mu u^\nu\gamma_5\gamma^\lambda B_{6\nu}^* u^T_{\ \lambda}\rangle$ + H.c.			2011	
$\langle u^\mu f_-^{\ \nu\lambda}\rangle\langle \bar{B}_{6\nu}^* u^\rho\gamma_5\gamma_\mu D_\rho B_{6\lambda}^*\rangle$ + H.c.			786		$\langle \bar{B}_6 u^\mu u^\nu u_\mu\gamma_5\gamma_\nu B_6^{*\lambda}u^T_{\ \lambda}\rangle$ + H.c.	1016		2012	
$\langle \bar{B}_6^{*\mu} u_\mu\nabla^\nu f_{-\nu}^{\ \ \lambda}B_{6\lambda}^*\rangle$ + H.c.	406	I	787	I	$\langle \bar{B}_6 u^\mu u^\nu u_\mu\gamma_5\gamma^\lambda B_{6\nu}^* u^T_{\ \lambda}\rangle$ + H.c.	1017		2013	
$\langle \bar{B}_6^{*\mu} u^\nu\nabla_\nu f_{-\mu}^{\ \ \lambda}B_{6\lambda}^*\rangle$ + H.c.	407	I	788	I	$\langle \bar{B}_6 u^\mu u^\nu u_\nu\gamma_5\gamma_\mu B_6^{*\lambda}u^T_{\ \lambda}\rangle$ + H.c.			2014	
$\langle \bar{B}_6^{*\mu} u^\nu\nabla_\nu f_{-\mu}^{\ \ \lambda}B_{6\lambda}^*\rangle$ + H.c.	408		789		$\langle \bar{B}_6 u^\mu u^\nu u_\nu\gamma_5\gamma^\lambda B_{6\mu}^* u^T_{\ \lambda}\rangle$ + H.c.			2015	
$\langle \bar{B}_6^{*\mu} u^\nu\nabla^\lambda f_{-\mu\lambda}B_{6\nu}^*\rangle$ + H.c.	409		790		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\mu B_{6\nu}^* u^T_{\ \lambda}\rangle$ + H.c.	1018		2016	
$\langle \bar{B}_6^{*\mu} u^\nu\nabla^\lambda f_{-\nu\lambda}B_{6\mu}^*\rangle$ + H.c.	410	I	791	I	$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\mu B_{6\lambda}^* u^T_{\ \nu}\rangle$ + H.c.			2017	
$\langle \bar{B}_6^{*\mu} u_\mu\nabla^\nu f_-^{\ \lambda\rho}D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	411		792	I	$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\nu B_{6\mu}^* u^T_{\ \lambda}\rangle$ + H.c.			2018	
$\langle \bar{B}_6^{*\mu} u^\nu\nabla_\mu f_-^{\ \lambda\rho}D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	412	I	793	I	$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^* u^T_{\ \mu}\rangle$ + H.c.			2019	
$\langle \bar{B}_6^{*\mu} u^\nu\nabla^\lambda f_{-\mu}^{\ \ \rho}D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	413		794		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\lambda B_{6\mu}^* u^T_{\ \nu}\rangle$ + H.c.			2020	
$\langle \bar{B}_6^{*\mu} u^\nu\nabla^\lambda f_{-\mu}^{\ \ \rho}D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			795		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^* u^T_{\ \mu}\rangle$ + H.c.			2021	
$\langle \bar{B}_6^{*\mu} u^\nu\nabla^\lambda f_{-\nu}^{\ \ \rho}D_{\lambda\rho}B_{6\mu}^*\rangle$ + H.c.	414	I	796	I	$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\mu D_{\nu\lambda}B_6^{*\rho}u^T_{\ \rho}\rangle$ + H.c.	1019		2022	
$\langle \bar{B}_6^{*\mu} u^\nu\nabla^\lambda f_{-\lambda}^{\ \ \rho}D_{\nu\rho}B_{6\mu}^*\rangle$ + H.c.	415		797		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\mu D_\nu B_{6\lambda}^{*\rho}u^T_{\ \rho}\rangle$ + H.c.	1020		2023	
$i\langle \bar{B}_6^{*\mu} u_\mu\nabla^\nu f_-^{\ \lambda\rho}\sigma_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	416		798		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\mu D_\lambda B_{6\nu}^{*\rho}u^T_{\ \rho}\rangle$ + H.c.	1021		2024	
$i\langle \bar{B}_6^{*\mu} u^\nu\nabla_\mu f_-^{\ \lambda\rho}\sigma_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			799		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\nu D_{\mu\lambda}B_6^{*\rho}u^T_{\ \rho}\rangle$ + H.c.	1022		2025	
$\langle \bar{B}_6^{*\mu} u^\nu\nabla_\mu h_\nu^{\ \lambda}B_{6\lambda}^*\rangle$ + H.c.	417		800		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\nu D_\mu B_{6\lambda}^{*\rho}u^T_{\ \rho}\rangle$ + H.c.			2026	
$\langle \bar{B}_6^{*\mu} u_\mu\nabla^\nu h^{\lambda\rho}D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	418		801		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\nu D_\lambda^{\ \rho}B_{6\mu}^* u^T_{\ \rho}\rangle$ + H.c.			2027	
$\langle \bar{B}_6^{*\mu} u^\nu\nabla_\nu h^{\lambda\rho}D_{\lambda\rho}B_{6\mu}^*\rangle$ + H.c.	419	I	802	I	$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\lambda D_{\mu\nu}B_6^{*\rho}u^T_{\ \rho}\rangle$ + H.c.			2028	
$\langle \bar{B}_6^{*\mu} u^\nu\nabla^\lambda h^{\rho\sigma}D_{\nu\lambda\rho\sigma}B_{6\mu}^*\rangle$ + H.c.	420		803		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\lambda D_\mu B_{6\nu}^{*\rho}u^T_{\ \rho}\rangle$ + H.c.			2029	
$i\langle \bar{B}_6^{*\mu} u^\nu\nabla_\mu h^{\lambda\rho}\sigma_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	421		804		$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma_\lambda D_\nu^{\ \rho}B_{6\mu}^* u^T_{\ \rho}\rangle$ + H.c.			2030	
$\langle \bar{B}_6^{*\mu} u_\mu B_6^{*\nu}\nabla^\lambda f_{-\nu\lambda}^T\rangle$ + H.c.	422	I	805	I	$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma^\rho D_{\mu\nu}B_{6\lambda}^* u^T_{\ \rho}\rangle$ + H.c.			2031	
$\langle \bar{B}_6^{*\mu} u^\nu B_{6\mu}^*\nabla^\lambda f_{-\nu\lambda}^T\rangle$	423	I	806	I	$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma^\rho D_{\mu\lambda}B_{6\nu}^* u^T_{\ \rho}\rangle$ + H.c.			2032	
$\langle \bar{B}_6^{*\mu} u^\nu D_\nu^{\ \lambda}B_{6\mu}^*\nabla^\rho f_{-\lambda\rho}^T\rangle$	424	I	807	I	$\langle \bar{B}_6 u^\mu u^\nu u^\lambda\gamma_5\gamma^\rho D_{\nu\lambda}B_{6\mu}^* u^T_{\ \rho}\rangle$ + H.c.			2033	
$\langle \bar{B}_6^{*\mu} f_{-\mu}^{\ \ \nu} f_{-\nu}^{\ \ \lambda}B_{6\lambda}^*\rangle$	425		808	I	$\langle \bar{B}_6 u^\mu u_\mu\gamma_5\gamma^\nu B_6^{*\lambda}u^T_{\ \nu}u^T_{\ \lambda}\rangle$ + H.c.			2034	
$\langle \bar{B}_6^{*\mu} f_-^{\ \nu\lambda} f_{-\mu\lambda}B_{6\lambda}^*\rangle$ + H.c.			809		$\langle \bar{B}_6 u^\mu u_\mu\gamma_5\gamma^\nu B_6^{*\lambda}u^T_{\ \lambda}u^T_{\ \nu}\rangle$ + H.c.			2035	
$\langle \bar{B}_6^{*\mu} f_-^{\ \nu\lambda} f_{-\nu\lambda}B_{6\mu}^*\rangle$ + H.c.			810		$\langle \bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\mu B_6^{*\lambda}u^T_{\ \nu}u^T_{\ \lambda}\rangle$ + H.c.	1023		2036	
$\langle \bar{B}_6^{*\mu} f_-^{\ \nu\lambda} f_{-\nu}^{\ \ \rho}D_{\lambda\rho}B_{6\mu}^*\rangle$ + H.c.			811		$\langle \bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\mu B_6^{*\lambda}u^T_{\ \lambda}u^T_{\ \nu}\rangle$ + H.c.			2037	
$\langle \bar{B}_6^{*\mu} f_{-\mu}^{\ \ \nu} B_6^{*\lambda} f_{-\nu\lambda}^T\rangle$ + H.c.	426	I	812	I	$\langle \bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\nu B_6^{*\lambda}u^T_{\ \mu}u^T_{\ \lambda}\rangle$ + H.c.			2038	
$\langle \bar{B}_6^{*\mu} f_-^{\ \nu\lambda} B_{6\mu}^* f_{-\nu\lambda}^T\rangle$	427	I	813	I	$\langle \bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\nu B_6^{*\lambda}u^T_{\ \lambda}u^T_{\ \mu}\rangle$ + H.c.			2039	
$\langle \bar{B}_6^{*\mu} f_-^{\ \nu\lambda} D_\nu B_{6\mu}^* f_{-\lambda\rho}^T\rangle$ + H.c.	428	I	814	I	$\langle \bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\mu D_\nu^{\ \lambda}B_6^{*\rho}u^T_{\ \lambda}u^T_{\ \rho}\rangle$ + H.c.	1024		2040	
$\langle \bar{B}_6^{*\mu} h^{\nu\lambda} h_{\nu\lambda}B_{6\mu}^*\rangle$	429		815		$\langle \bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\mu D_\nu^{\ \lambda}B_6^{*\rho}u^T_{\ \rho}u^T_{\ \lambda}\rangle$ + H.c.			2041	
$\langle \bar{B}_6^{*\mu} h^{\nu\lambda} B_{6\mu}^* h_{\nu\lambda}^T\rangle$	430	I	816	I	$\langle \bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\mu D^{\lambda\rho}B_{6\nu}^* u^T_{\ \lambda}u^T_{\ \rho}\rangle$ + H.c.			2042	
$\langle \bar{B}_6^{*\mu} B_{6\mu}^*\rangle\langle u^\nu\nabla^\lambda f_{-\nu\lambda}\rangle$ + H.c.			817	I	$\langle \bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\nu D_\mu^{\ \lambda}B_6^{*\rho}u^T_{\ \lambda}u^T_{\ \rho}\rangle$ + H.c.			2043	
$\langle \bar{B}_6^{*\mu} B_6^{*\nu}\rangle\langle u_\mu\nabla^\lambda f_{-\nu\lambda}\rangle$ + H.c.			818	I	$\langle \bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\nu D_\mu^{\ \lambda}B_6^{*\rho}u^T_{\ \rho}u^T_{\ \lambda}\rangle$ + H.c.			2044	
$\langle \bar{B}_6^{*\mu} B_6^{*\nu}\rangle\langle u^\lambda\nabla_\mu f_{-\nu\lambda}\rangle$ + H.c.			819	I	$\langle \bar{B}_6 u^\mu u^\nu\gamma_5\gamma_\nu D^{\lambda\rho}B_{6\mu}^* u^T_{\ \lambda}u^T_{\ \rho}\rangle$ + H.c.			2045	
$\langle \bar{B}_6^{*\mu} B_6^{*\nu}\rangle\langle u^\lambda\nabla_\mu h_{\nu\lambda}\rangle$ + H.c.			820	I	$\langle \bar{B}_6\gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle u_\mu u_\nu u^\lambda u_\lambda\rangle$ + H.c.			2046	
$\langle \bar{B}_6^{*\mu} B_{6\mu}^*\rangle\langle h^{\nu\lambda} h_{\nu\lambda}\rangle$ + H.c.			821		$\langle \bar{B}_6\gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle u_\mu u^\lambda u_\nu u_\lambda\rangle$ + H.c.			2047	
$\langle \bar{B}_6^{*\mu} D^{\nu\lambda} B_{6\mu}^*\rangle\langle u_\nu\nabla^\rho f_{-\lambda\rho}\rangle$ + H.c.			822	I	$\langle \bar{B}_6\gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle u_\mu u^\lambda u_\lambda u_\nu\rangle$ + H.c.			2048	

(Table continued)

TABLE VIII. (Continued)

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$\langle\bar{B}_6^{*\mu}D^{\nu\lambda}B_{6\mu}^*\rangle\langle u^\rho\nabla_\nu f_{-\lambda\rho}\rangle$ + H.c.			823	I	$\langle\bar{B}_6\gamma_5\gamma^\mu D^{\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu u_\nu u_\lambda u_\rho\rangle$ + H.c.			2049	
$\langle\bar{B}_6^{*\mu}D^{\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu\nabla_\nu f_{-\lambda\rho}\rangle$ + H.c.			824		$\langle\bar{B}_6\gamma_5\gamma^\mu D^{\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu u_\nu u_\rho u_\lambda\rangle$ + H.c.			2050	
$\langle\bar{B}_6^{*\mu}D^{\nu\lambda}B_{6\mu}^*\rangle\langle u^\rho\nabla_\nu h_{\lambda\rho}\rangle$ + H.c.			825	I	$\langle\bar{B}_6\gamma_5\gamma^\mu D^{\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu u_\rho u_\nu u_\lambda\rangle$ + H.c.			2051	
$\langle\bar{B}_6^{*\mu}D^{\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu\nabla_\nu h_{\lambda\rho}\rangle$ + H.c.			826		$\langle u^\mu u_\mu\rangle\langle\bar{B}_6 u^\nu u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			2052	
$\langle\bar{B}_6^{*\mu}D^{\nu\lambda\rho}B_{6\mu}^*\rangle\langle u_\nu\nabla_\lambda h_{\rho\sigma}\rangle$ + H.c.			827		$\langle u^\mu u_\mu\rangle\langle\bar{B}_6 u^\nu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			2053	
$i\langle\bar{B}_6^{*\mu}f_{-\mu}{}^\nu u_\nu u^\lambda B_{6\lambda}^*\rangle$ + H.c.	431	I	828	I	$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u_\mu u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			2054	
$i\langle\bar{B}_6^{*\mu}f_{-\mu}{}^\nu u^\lambda u_\nu B_{6\lambda}^*\rangle$ + H.c.	432	I	829	I	$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u_\mu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			2055	
$i\langle\bar{B}_6^{*\mu}f_{-\mu}{}^\nu u^\lambda u_\lambda B_{6\nu}^*\rangle$ + H.c.	433		830		$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u_\lambda u^\lambda\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			2056	
$i\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}u_\mu u_\nu B_{6\lambda}^*\rangle$ + H.c.	434	I	831		$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u^\lambda u^\rho\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			2057	
$i\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}u_\nu u_\mu B_{6\lambda}^*\rangle$ + H.c.			832		$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u^\lambda u^\rho\gamma_5\gamma_\mu D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.			2058	
$i\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}u_\nu u_\lambda B_{6\mu}^*\rangle$ + H.c.	435		833		$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u^\lambda u^\rho\gamma_5\gamma_\mu D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			2059	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu u^\lambda u^\rho D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	436	I	834	I	$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u^\lambda u^\rho\gamma_5\gamma_\lambda D_{\mu\nu}B_{6\rho}^*\rangle$ + H.c.			2060	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu u^\lambda u^\rho D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.	437	I	835		$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u^\lambda u^\rho\gamma_5\gamma_\lambda D_{\mu\rho}B_{6\nu}^*\rangle$ + H.c.			2061	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu u^\lambda u^\rho D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.	438		836		$\langle u^\mu u_\mu\rangle\langle\bar{B}_6 u^\nu\gamma_5\gamma_\nu B_6^{*\lambda}u^T{}_\lambda\rangle$ + H.c.			2062	
$i\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}u_\nu u^\rho D_{\lambda\rho}B_{6\mu}^*\rangle$ + H.c.	439		837		$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 u^\lambda\gamma_5\gamma_\mu D_{\nu\lambda}B_6^{*\rho}u^T{}_\rho\rangle$ + H.c.			2063	
$i\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}u^\rho u_\nu D_{\lambda\rho}B_{6\mu}^*\rangle$ + H.c.			838		$\langle\bar{B}_6 u^\mu u_\mu f_-^{\nu\lambda}D_\nu B_{6\lambda}^*\rangle$ + H.c.			2064	I
$\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu u^\lambda u^\rho\sigma_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	440		839		$\langle\bar{B}_6 u^\mu u^\nu f_{-\mu}{}^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.	1025	I	2065	I
$\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu u^\lambda u^\rho\sigma_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.	441		840		$\langle\bar{B}_6 u^\mu u^\nu f_{-\mu}{}^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.	1026	I	2066	I
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu u_\nu B_6^{*\lambda}u^T{}_\lambda\rangle$ + H.c.	442		841	I	$\langle\bar{B}_6 u^\mu u^\nu f_{-\nu}{}^\lambda D_\mu B_{6\lambda}^*\rangle$ + H.c.	1027	I	2067	I
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu u^\lambda B_{6\nu}^* u^T{}_\lambda\rangle$ + H.c.	443		842		$\langle\bar{B}_6 u^\mu u^\nu f_{-\nu}{}^\lambda D_\lambda B_{6\mu}^*\rangle$ + H.c.	1028	I	2068	I
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu u^\lambda B_{6\lambda}^* u^T{}_\nu\rangle$ + H.c.	444	I	843	I	$\langle\bar{B}_6 u^\mu u^\nu f_-^{\lambda\rho}D_{\mu\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			2069	
$i\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}u_\mu B_{6\nu}^* u^T{}_\lambda\rangle$ + H.c.	445		844		$i\langle\bar{B}_6 u^\mu u^\nu f_-^{\lambda\rho}\sigma_{\mu\nu}D_\lambda B_{6\rho}^*\rangle$ + H.c.	1029	I	2070	I
$i\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}u_\nu B_{6\mu}^* u^T{}_\lambda\rangle$ + H.c.	446		845		$i\langle\bar{B}_6 u^\mu u^\nu f_-^{\lambda\rho}\sigma_{\mu\lambda}D_\nu B_{6\rho}^*\rangle$ + H.c.	1030	I	2071	
$i\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}u_\nu B_{6\lambda}^* u^T{}_\mu\rangle$ + H.c.			846		$i\langle\bar{B}_6 u^\mu u^\nu f_-^{\lambda\rho}\sigma_{\mu\lambda}D_\rho B_{6\nu}^*\rangle$ + H.c.	1031		2072	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu u^\lambda D_{\nu\lambda}B_6^{*\rho}u^T{}_\rho\rangle$ + H.c.	447		847		$i\langle\bar{B}_6 u^\mu u^\nu f_-^{\lambda\rho}\sigma_{\nu\lambda}D_\mu B_{6\rho}^*\rangle$ + H.c.	1032	I	2073	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu u^\lambda D_\nu{}^\rho B_{6\lambda}^* u^T{}_\rho\rangle$ + H.c.			848		$\langle\bar{B}_6 u^\mu u_\mu h^{\nu\lambda}D_\nu B_{6\lambda}^*\rangle$ + H.c.			2074	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu u^\lambda D_\lambda{}^\rho B_{6\nu}^* u^T{}_\rho\rangle$ + H.c.	448		849		$\langle\bar{B}_6 u^\mu u^\nu h_\mu{}^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.	1033		2075	
$i\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}u_\nu D_\lambda{}^\rho B_{6\mu}^* u^T{}_\rho\rangle$ + H.c.	449		850		$\langle\bar{B}_6 u^\mu u^\nu h_\mu{}^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.	1034		2076	
$i\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}u^\rho D_{\nu\rho}B_{6\mu}^* u^T{}_\lambda\rangle$ + H.c.	450		851		$\langle\bar{B}_6 u^\mu u^\nu h_\nu{}^\lambda D_\mu B_{6\lambda}^*\rangle$ + H.c.			2077	
$\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu u^\lambda\sigma_{\nu\lambda}B_6^{*\rho}u^T{}_\rho\rangle$ + H.c.	451		852		$\langle\bar{B}_6 u^\mu u^\nu h_\nu{}^\lambda D_\lambda B_{6\mu}^*\rangle$ + H.c.			2078	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu B_{6\nu}^* u^{T\lambda}u^T{}_\lambda\rangle$ + H.c.			853		$\langle\bar{B}_6 u^\mu u^\nu h^{\lambda\rho}D_{\mu\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			2079	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu B_6^{*\lambda}u^T{}_\nu u^T{}_\lambda\rangle$ + H.c.	452		854	I	$\langle\bar{B}_6 u^\mu u^\nu h^{\lambda\rho}D_{\mu\lambda\rho}B_{6\nu}^*\rangle$ + H.c.	1035		2080	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu B_6^{*\lambda}u^T{}_\lambda u^T{}_\nu\rangle$ + H.c.			855		$\langle\bar{B}_6 u^\mu u^\nu h^{\lambda\rho}D_{\nu\lambda\rho}B_{6\mu}^*\rangle$ + H.c.			2081	
$i\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}B_{6\mu}^* u^T{}_\nu u^T{}_\lambda\rangle$	453		856		$i\langle\bar{B}_6 u^\mu u^\nu h^{\lambda\rho}\sigma_{\mu\nu}D_\lambda B_{6\rho}^*\rangle$ + H.c.	1036		2082	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu D_\nu{}^\lambda B_6^{*\rho}u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.	454		857	I	$i\langle\bar{B}_6 u^\mu u^\nu h^{\lambda\rho}\sigma_{\mu\lambda}D_\nu B_{6\rho}^*\rangle$ + H.c.	1037		2083	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu D_\nu{}^\lambda B_6^{*\rho}u^T{}_\rho u^T{}_\lambda\rangle$ + H.c.			858		$i\langle\bar{B}_6 u^\mu u^\nu h^{\lambda\rho}\sigma_{\mu\lambda}D_\rho B_{6\nu}^*\rangle$ + H.c.			2084	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu D^{\lambda\rho}B_{6\nu}^* u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.			859		$i\langle\bar{B}_6 u^\mu u^\nu h^{\lambda\rho}\sigma_{\nu\lambda}D_\mu B_{6\rho}^*\rangle$ + H.c.			2085	
$i\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}D_\nu{}^\rho B_{6\mu}^* u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.	455		860		$\langle\bar{B}_6 u^\mu u^\nu D_\mu B_6^{*\lambda}f_{-\nu\lambda}^T\rangle$ + H.c.	1038		2086	I
$\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu\sigma_\nu{}^\lambda B_6^{*\rho}u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.	456		861		$\langle\bar{B}_6 u^\mu u^\nu D_\nu B_6^{*\lambda}f_{-\mu\lambda}^T\rangle$ + H.c.			2087	
$\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu\sigma_\nu{}^\lambda B_6^{*\rho}u^T{}_\rho u^T{}_\lambda\rangle$ + H.c.			862		$\langle\bar{B}_6 u^\mu u^\nu D^\lambda B_{6\mu}^* f_{-\nu\lambda}^T\rangle$ + H.c.	1039		2088	I
$i\langle\bar{B}_6^{*\mu}u_\mu f_+^{\nu\lambda}u_\nu B_{6\lambda}^*\rangle$ + H.c.	457	I	863	I	$\langle\bar{B}_6 u^\mu u^\nu D^\lambda B_{6\nu}^* f_{-\mu\lambda}^T\rangle$ + H.c.			2089	
$i\langle\bar{B}_6^{*\mu}u^\nu f_{+\mu}{}^\lambda u_\nu B_{6\lambda}^*\rangle$	458		864		$i\langle\bar{B}_6 u^\mu u^\nu\sigma_\mu{}^\lambda D_\nu B_6^{*\rho}f_{-\lambda\rho}^T\rangle$ + H.c.	1040		2090	
$i\langle\bar{B}_6^{*\mu}u^\nu f_{+\mu}{}^\lambda u_\lambda B_{6\nu}^*\rangle$ + H.c.	459		865		$i\langle\bar{B}_6 u^\mu u^\nu\sigma_\mu{}^\lambda D^\rho B_{6\nu}^* f_{-\lambda\rho}^T\rangle$ + H.c.			2091	
$i\langle\bar{B}_6^{*\mu}u^\nu f_{+\nu}{}^\lambda u_\lambda B_{6\mu}^*\rangle$	460		866		$i\langle\bar{B}_6 u^\mu u^\nu\sigma_\nu{}^\lambda D_\mu B_6^{*\rho}f_{-\lambda\rho}^T\rangle$ + H.c.			2092	
$i\langle\bar{B}_6^{*\mu}u_\mu f_+^{\nu\lambda}u^\rho D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.	461	I	867	I	$\langle\bar{B}_6 u^\mu f_{-\mu}{}^\nu u^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.	1041		2093	
$i\langle\bar{B}_6^{*\mu}u^\nu f_{+\mu}{}^\lambda u^\rho D_{\nu\rho}B_{6\lambda}^*\rangle$	462		868		$\langle\bar{B}_6 u^\mu f_{-\mu}{}^\nu u^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.	1042		2094	

(Table continued)

TABLE VIII. *(Continued)*

O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$	O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$
$i\langle \bar{B}_6^{*\mu} u^\nu f_{+\mu}{}^\lambda u^\rho D_{\lambda\rho} B_{6\nu}^*\rangle$ + H.c.	463		869		$\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} u_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.	1043		2095	
$i\langle \bar{B}_6^{*\mu} u^\nu f_{+\nu}{}^\lambda u^\rho D_{\lambda\rho} B_{6\mu}^*\rangle$ + H.c.	464		870		$\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} u_\nu D_\mu B_{6\lambda}^*\rangle$ + H.c.	1044		2096	
$\langle \bar{B}_6^{*\mu} u_\mu f_+{}^{\nu\lambda} u^\rho \sigma_{\nu\lambda} B_{6\rho}^*\rangle$	465		871		$\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} u_\nu D_\lambda B_{6\mu}^*\rangle$ + H.c.	1045		2097	
$\langle \bar{B}_6^{*\mu} u^\nu f_{+\mu}{}^\lambda u^\rho \sigma_{\nu\rho} B_{6\lambda}^*\rangle$	466		872		$\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} u^\rho D_{\mu\nu\rho} B_{6\lambda}^*\rangle$ + H.c.	1046		2098	
$i\langle \bar{B}_6^{*\mu} B_{6\mu}^*\rangle\langle f_+{}^{\nu\lambda} u_\nu u_\lambda\rangle$ + H.c.			873	I	$i\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} u^\rho \sigma_{\mu\nu} D_\lambda B_{6\rho}^*\rangle$ + H.c.	1047		2099	
$i\langle \bar{B}_6^{*\mu} B_6^{*\nu}\rangle\langle f_{+\mu\nu} u^\lambda u_\lambda\rangle$	467		874		$i\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} u^\rho \sigma_{\mu\nu} D_\rho B_{6\lambda}^*\rangle$ + H.c.	1048		2100	
$i\langle \bar{B}_6^{*\mu} B_6^{*\nu}\rangle\langle f_{+\mu}{}^\lambda u_\nu u_\lambda\rangle$	468		875		$i\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} u^\rho \sigma_{\mu\rho} D_\nu B_{6\lambda}^*\rangle$ + H.c.	1049		2101	
$i\langle \bar{B}_6^{*\mu} B_6^{*\nu}\rangle\langle f_{+\mu}{}^\lambda u_\lambda u_\nu\rangle$ + H.c.			876		$i\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} u^\rho \sigma_{\nu\lambda} D_\mu B_{6\rho}^*\rangle$ + H.c.	1050		2102	
$i\langle \bar{B}_6^{*\mu} D^{\nu\lambda} B_{6\mu}^*\rangle\langle f_{+\nu}{}^\rho u_\lambda u_\rho\rangle$ + H.c.			877	I	$\langle \bar{B}_6 u^\mu f_{-\mu}{}^\nu D_\nu B_6^{*\lambda} u^T{}_\lambda\rangle$ + H.c.	1051		2103	I
$i\langle \bar{B}_6^{*\mu} D^{\nu\lambda} B_6^{*\rho}\rangle\langle f_{+\mu\nu} u_\lambda u_\rho\rangle$ + H.c.	469		878		$\langle \bar{B}_6 u^\mu f_{-\mu}{}^\nu D^\lambda B_{6\nu}^* u^T{}_\lambda\rangle$ + H.c.	1052		2104	I
$i\langle \bar{B}_6^{*\mu} D^{\nu\lambda} B_6^{*\rho}\rangle\langle f_{+\mu\nu} u_\rho u_\lambda\rangle$ + H.c.			879		$\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} D_\mu B_{6\nu}^* u^T{}_\lambda\rangle$ + H.c.	1053		2105	
$i\langle \bar{B}_6^{*\mu} D^{\nu\lambda} B_6^{*\rho}\rangle\langle f_{+\mu\rho} u_\nu u_\lambda\rangle$	470		880		$\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} D_\nu B_{6\mu}^* u^T{}_\lambda\rangle$ + H.c.	1054		2106	
$\langle \bar{B}_6^{*\mu} \sigma^{\nu\lambda} B_6^{*\rho}\rangle\langle f_{+\mu\nu} u_\lambda u_\rho\rangle$ + H.c.	471		881		$\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} D_\nu B_{6\lambda}^* u^T{}_\mu\rangle$ + H.c.	1055		2107	
$\langle \bar{B}_6^{*\mu} \sigma^{\nu\lambda} B_6^{*\rho}\rangle\langle f_{+\mu\nu} u_\rho u_\lambda\rangle$ + H.c.			882		$\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} D_{\mu\nu}{}^\rho B_{6\lambda}^* u^T{}_\rho\rangle$ + H.c.	1056		2108	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u_\nu u^\lambda B_{6\lambda}^*\rangle$ + H.c.			883		$i\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} \sigma_{\mu\nu} D_\lambda B_6^{*\rho} u^T{}_\rho\rangle$ + H.c.	1057		2109	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u^\lambda u_\nu B_{6\lambda}^*\rangle$ + H.c.			884		$i\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} \sigma_{\mu\nu} D^\rho B_{6\lambda}^* u^T{}_\rho\rangle$ + H.c.	1058		2110	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u^\lambda u_\lambda B_{6\nu}^*\rangle$ + H.c.			885		$i\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} \sigma_\mu{}^\rho D_\nu B_{6\lambda}^* u^T{}_\rho\rangle$ + H.c.	1059		2111	
$i\langle f_+{}^{\mu\lambda}\rangle\langle \bar{B}_6^{*\lambda} u_\mu u_\nu B_{6\lambda}^*\rangle$ + H.c.			886		$i\langle \bar{B}_6 u^\mu f_-{}^{\nu\lambda} \sigma_{\nu\lambda} D_\mu B_6^{*\rho} u^T{}_\rho\rangle$ + H.c.	1060		2112	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u^\lambda u^\rho D_{\nu\lambda} B_{6\rho}^*\rangle$ + H.c.			887		$\langle \bar{B}_6 u^\mu h_\mu{}^\nu u^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.	1061		2113	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u^\lambda u^\rho D_{\nu\rho} B_{6\lambda}^*\rangle$ + H.c.			888		$\langle \bar{B}_6 u^\mu h_\mu{}^\nu u^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.			2114	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u^\lambda u^\rho D_{\lambda\rho} B_{6\nu}^*\rangle$ + H.c.			889		$\langle \bar{B}_6 u^\mu h^{\nu\lambda} u_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.			2115	
$i\langle f_+{}^{\mu\lambda}\rangle\langle \bar{B}_6^{*\lambda} u_\mu u^\rho D_{\nu\rho} B_{6\lambda}^*\rangle$ + H.c.			890		$\langle \bar{B}_6 u^\mu h^{\nu\lambda} u_\nu D_\mu B_{6\lambda}^*\rangle$ + H.c.			2116	
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u^\lambda u^\rho \sigma_{\nu\lambda} B_{6\rho}^*\rangle$ + H.c.			891		$\langle \bar{B}_6 u^\mu h^{\nu\lambda} u_\nu D_\lambda B_{6\mu}^*\rangle$ + H.c.			2117	
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u^\lambda u^\rho \sigma_{\nu\rho} B_{6\lambda}^*\rangle$ + H.c.			892		$\langle \bar{B}_6 u^\mu h^{\nu\lambda} u^\rho D_{\mu\nu\lambda} B_{6\rho}^*\rangle$ + H.c.			2118	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u_\nu B_6^{*\lambda} u^T{}_\lambda\rangle$ + H.c.			893		$\langle \bar{B}_6 u^\mu h^{\nu\lambda} u^\rho D_{\mu\nu\rho} B_{6\lambda}^*\rangle$ + H.c.			2119	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u^\lambda B_{6\nu}^* u^T{}_\lambda\rangle$ + H.c.			894		$\langle \bar{B}_6 u^\mu h^{\nu\lambda} u^\rho D_{\nu\lambda\rho} B_{6\mu}^*\rangle$ + H.c.			2120	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u^\lambda D_{\nu\lambda} B_6^{*\rho} u^T{}_\rho\rangle$ + H.c.			895		$i\langle \bar{B}_6 u^\mu h^{\nu\lambda} u^\rho \sigma_{\mu\nu} D_\lambda B_{6\rho}^*\rangle$ + H.c.	1062		2121	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u^\lambda D_\lambda{}^\rho B_{6\nu}^* u^T{}_\rho\rangle$ + H.c.			896		$i\langle \bar{B}_6 u^\mu h^{\nu\lambda} u^\rho \sigma_{\mu\nu} D_\rho B_{6\lambda}^*\rangle$ + H.c.			2122	
$\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* u^\lambda \sigma_{\nu\lambda} B_6^{*\rho} u^T{}_\rho\rangle$ + H.c.			897		$i\langle \bar{B}_6 u^\mu h^{\nu\lambda} u^\rho \sigma_{\mu\rho} D_\nu B_{6\lambda}^*\rangle$ + H.c.			2123	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* B_{6\nu}^*\rangle\langle u^\lambda u_\lambda\rangle$ + H.c.			898		$i\langle \bar{B}_6 u^\mu h^{\nu\lambda} u^\rho \sigma_{\nu\rho} D_\mu B_{6\lambda}^*\rangle$ + H.c.			2124	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* B_6^{*\lambda}\rangle\langle u_\nu u_\lambda\rangle$ + H.c.			899		$\langle \bar{B}_6 u^\mu h_\mu{}^\nu D_\nu B_6^{*\lambda} u^T{}_\lambda\rangle$ + H.c.	1063		2125	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* D_\nu B_6^{*\rho}\rangle\langle u_\lambda u_\rho\rangle$ + H.c.			900		$\langle \bar{B}_6 u^\mu h_\mu{}^\nu D^\lambda B_{6\nu}^* u^T{}_\lambda\rangle$ + H.c.	1064		2126	
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{6\mu}^* D^{\lambda\rho} B_{6\nu}^*\rangle\langle u_\lambda u_\rho\rangle$ + H.c.			901		$\langle \bar{B}_6 u^\mu h^{\nu\lambda} D_\mu B_{6\nu}^* u^T{}_\lambda\rangle$ + H.c.	1065		2127	
$\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u^\rho\rangle\langle \bar{B}_{6\mu}^* \sigma_{\nu\lambda} B_{6\rho}^*\rangle$ + H.c.			902		$\langle \bar{B}_6 u^\mu h^{\nu\lambda} D_\nu B_{6\mu}^* u^T{}_\lambda\rangle$ + H.c.			2128	
$i\langle f_+{}^{\mu\nu} u_\mu\rangle\langle \bar{B}_{6\nu}^* u^\lambda B_{6\lambda}^*\rangle$ + H.c.			903		$\langle \bar{B}_6 u^\mu h^{\nu\lambda} D_\nu B_{6\lambda}^* u^T{}_\mu\rangle$ + H.c.			2129	
$i\langle f_+{}^{\mu\nu} u^\lambda\rangle\langle \bar{B}_{6\mu}^* u_\nu B_{6\lambda}^*\rangle$ + H.c.			904		$\langle \bar{B}_6 u^\mu h^{\nu\lambda} D_{\mu\nu}{}^\rho B_6^{*\rho} u^T{}_\rho\rangle$ + H.c.	1066		2130	
$i\langle f_+{}^{\mu\nu} u^\lambda\rangle\langle \bar{B}_{6\mu}^* u_\lambda B_{6\nu}^*\rangle$ + H.c.			905		$\langle \bar{B}_6 u^\mu h^{\nu\lambda} D_{\mu}{}^\rho B_{6\mu}^* u^T{}_\rho\rangle$ + H.c.	1067		2131	
$i\langle f_+{}^{\mu\nu} u^\lambda\rangle\langle \bar{B}_{6\mu}^* u^\rho D_{\nu\lambda} B_{6\rho}^*\rangle$ + H.c.			906		$\langle \bar{B}_6 u^\mu h^{\nu\lambda} D_{\lambda}{}^\rho B_{6\mu}^* u^T{}_\rho\rangle$ + H.c.			2132	
$i\langle f_+{}^{\mu\nu} u^\lambda\rangle\langle \bar{B}_{6\mu}^* u^\rho D_{\nu\rho} B_{6\lambda}^*\rangle$ + H.c.			907		$i\langle \bar{B}_6 u^\mu h^{\nu\lambda} \sigma_{\mu\nu} D_\lambda B_6^{*\rho} u^T{}_\rho\rangle$ + H.c.			2133	
$i\langle f_+{}^{\mu\nu} u^\lambda\rangle\langle \bar{B}_{6\mu}^* u^\rho D_{\lambda\rho} B_{6\nu}^*\rangle$ + H.c.			908		$i\langle \bar{B}_6 u^\mu h^{\nu\lambda} \sigma_{\mu\nu} D^\rho B_{6\lambda}^* u^T{}_\rho\rangle$ + H.c.			2134	
$\langle f_+{}^{\mu\nu} u^\lambda\rangle\langle \bar{B}_{6\mu}^* u^\rho \sigma_{\nu\lambda} B_{6\rho}^*\rangle$ + H.c.			909		$i\langle \bar{B}_6 u^\mu h^{\nu\lambda} \sigma_\mu{}^\rho D_\nu B_{6\lambda}^* u^T{}_\rho\rangle$ + H.c.	1068		2135	
$i\langle \bar{B}_6^{*\mu} f_{+\mu}{}^\nu f_-{}^{\lambda\rho} \gamma_5\gamma_\nu D_\lambda B_{6\rho}^*\rangle$ + H.c.	472		910		$i\langle \bar{B}_6 u^\mu h^{\nu\lambda} \sigma_\nu{}^\rho D_\mu B_{6\lambda}^* u^T{}_\rho\rangle$ + H.c.			2136	
$i\langle \bar{B}_6^{*\mu} f_{+\mu}{}^\nu f_-{}^{\lambda\rho} \gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.	473		911		$\langle \bar{B}_6 u^\mu D_\mu B_6^{*\nu} u^{T\lambda} f_{-\nu\lambda}^T\rangle$ + H.c.			2137	
$i\langle \bar{B}_6^{*\mu} f_+{}^{\nu\lambda} f_{-\mu}{}^\rho \gamma_5\gamma_\nu D_\lambda B_{6\rho}^*\rangle$ + H.c.	474		912		$\langle \bar{B}_6 u^\mu D^\nu B_{6\mu}^* u^{T\lambda} f_{-\nu\lambda}^T\rangle$ + H.c.			2138	
$i\langle \bar{B}_6^{*\mu} f_+{}^{\nu\lambda} f_{-\mu}{}^\rho \gamma_5\gamma_\nu D_\rho B_{6\lambda}^*\rangle$ + H.c.	475		913		$\langle \bar{B}_6 u^\mu D^\nu B_6^{*\lambda} u^T{}_\nu f_{-\mu\lambda}^T\rangle$ + H.c.			2139	
$i\langle \bar{B}_6^{*\mu} f_{+\mu}{}^\nu h^{\lambda\rho} \gamma_5\gamma_\nu D_\lambda B_{6\rho}^*\rangle$ + H.c.	476		914		$\langle \bar{B}_6 u^\mu D^\nu B_6^{*\lambda} u^T{}_\lambda f_{-\mu\nu}^T\rangle$ + H.c.			2140	

(Table continued)

TABLE VIII. *(Continued)*

O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$	O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu h^{\lambda\rho}\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.	477		915		$i\langle\bar{B}_6 u^\mu\sigma_\mu{}^\nu D^\lambda B_6^{*\rho}u^T{}_\lambda f_{-\nu\rho}^T\rangle$ + H.c.			2141	
$i\langle\bar{B}_6^{*\mu}f_+{}^{\nu\lambda}h_\mu{}^\rho\gamma_5\gamma_\nu D_\lambda B_{6\rho}^*\rangle$ + H.c.	478		916		$i\langle\bar{B}_6 u^\mu\sigma_\mu{}^\nu D^\lambda B_6^{*\rho}u^T{}_\rho f_{-\nu\lambda}^T\rangle$ + H.c.			2142	
$i\langle\bar{B}_6^{*\mu}f_+{}^{\nu\lambda}h_\mu{}^\rho\gamma_5\gamma_\nu D_\rho B_{6\lambda}^*\rangle$ + H.c.	479		917		$i\langle\bar{B}_6 u^\mu\sigma^{\nu\lambda}D_\mu B_6^{*\rho}u^T{}_\nu f_{-\lambda\rho}^T\rangle$ + H.c.			2143	
$i\langle\bar{B}_6^{*\mu}f_+{}^{\nu\lambda}h_\nu{}^\rho\gamma_5\gamma_\lambda D_\rho B_{6\mu}^*\rangle$ + H.c.	480		918		$\langle\bar{B}_6 f_-{}^{\mu\nu}u_\mu u^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.			2144	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu\gamma_5\gamma^\lambda D_\nu B_6^{*\rho}f_{-\lambda\rho}^T\rangle$ + H.c.	481		919		$\langle\bar{B}_6 f_-{}^{\mu\nu}u_\mu u^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.			2145	
$i\langle\bar{B}_6^{*\mu}\nabla^\nu f_{+\nu}{}^\lambda u^\rho\gamma_5\gamma_\rho D_\lambda B_{6\mu}^*\rangle$ + H.c.	482		920		$\langle\bar{B}_6 f_-{}^{\mu\nu}u^\lambda u_\mu D_\nu B_{6\lambda}^*\rangle$ + H.c.			2146	
$i\langle\bar{B}_6^{*\mu}\nabla^\nu f_+{}^\lambda\gamma_5\gamma^\rho D_\lambda B_{6\mu}^* u^T{}_\rho\rangle$	483		921		$\langle\bar{B}_6 f_-{}^{\mu\nu}u^\lambda u_\mu D_\lambda B_{6\nu}^*\rangle$ + H.c.			2147	
$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{6\mu}f_-{}^{\lambda\rho}\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.	484		922		$i\langle\bar{B}_6 f_-{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\nu}D_\lambda B_{6\rho}^*\rangle$ + H.c.			2148	
$i\langle f_+{}^{\mu\nu}f_{-\mu}{}^\lambda\rangle\langle\bar{B}_6^{*\rho}\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.			923		$i\langle\bar{B}_6 f_-{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\lambda}D_\nu B_{6\rho}^*\rangle$ + H.c.			2149	
$i\langle f_+{}^{\mu\nu}f_{-\mu}{}^\lambda\rangle\langle\bar{B}_6^{*\rho}\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.			924		$i\langle\bar{B}_6 f_-{}^{\mu\nu}u^\lambda u^\rho\sigma_{\mu\nu}D_\rho B_{6\lambda}^*\rangle$ + H.c.			2150	
$i\langle f_+{}^{\mu\nu}h_\mu{}^\lambda\rangle\langle\bar{B}_6^{*\rho}\gamma_5\gamma_\nu D_\lambda B_{6\rho}^*\rangle$ + H.c.			925		$\langle\bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle u_\mu u^\lambda f_{-\nu\lambda}\rangle$ + H.c.			2151	
$i\langle f_+{}^{\mu\nu}h_\mu{}^\lambda\rangle\langle\bar{B}_6^{*\rho}\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.			926		$\langle\bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle u_\nu u^\lambda f_{-\mu\lambda}\rangle$ + H.c.			2152	I
$i\langle f_+{}^{\mu\nu}h^{\lambda\rho}\rangle\langle\bar{B}_{6\mu}^*\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.			927		$\langle\bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle u^\lambda u_\mu f_{-\nu\lambda}\rangle$ + H.c.			2153	
$i\langle f_+{}^{\mu\nu}h^{\lambda\rho}\rangle\langle\bar{B}_{6\mu}^*\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.			928		$\langle\bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle u^\lambda u_\nu f_{-\mu\lambda}\rangle$ + H.c.			2154	
$i\langle\nabla^\mu f_{+\mu}{}^\nu\rangle\langle\bar{B}_6^{*\lambda}u^\rho\gamma_5\gamma_\rho D_\nu B_{6\lambda}^*\rangle$	485		929		$\langle\bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle u^\lambda u_\lambda f_{-\mu\nu}\rangle$ + H.c.			2155	
$i\langle\nabla^\mu f_{+\mu}{}^\nu u^\lambda\rangle\langle\bar{B}_6^{*\rho}\gamma_5\gamma_\lambda D_\nu B_{6\rho}^*\rangle$ + H.c.			930		$\langle\bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle u_\mu u^\lambda h_{\nu\lambda}\rangle$ + H.c.			2156	
$\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu f_{+\nu}{}^\lambda B_{6\lambda}^*\rangle$	486	I	931	I	$\langle\bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle u_\nu u^\lambda h_{\mu\lambda}\rangle$ + H.c.			2157	
$\langle\bar{B}_6^{*\mu}f_+{}^{\nu\lambda}f_{+\mu\nu}B_{6\lambda}^*\rangle$	487		932		$\langle\bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle u^\lambda u_\mu h_{\nu\lambda}\rangle$ + H.c.			2158	
$\langle\bar{B}_6^{*\mu}f_+{}^{\nu\lambda}f_{+\nu\lambda}B_{6\mu}^*\rangle$	488		933		$\langle\bar{B}_6 D^{\mu\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu u_\nu f_{-\lambda\rho}\rangle$ + H.c.			2159	
$\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu f_+{}^{\lambda\rho}D_{\nu\lambda}B_{6\rho}^*\rangle$	489		934		$\langle\bar{B}_6 D^{\mu\nu\lambda}B_6^{*\rho}\rangle\langle u_\mu u_\rho h_{\nu\lambda}\rangle$ + H.c.			2160	
$\langle\bar{B}_6^{*\mu}f_+{}^{\nu\lambda}f_{+\nu}{}^\rho D_{\lambda\rho}B_{6\mu}^*\rangle$	490		935		$i\langle\bar{B}_6\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\nu f_{-\lambda\rho}\rangle$ + H.c.			2161	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu f_+{}^{\lambda\rho}\sigma_{\nu\lambda}B_{6\rho}^*\rangle$	491		936		$i\langle\bar{B}_6\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\lambda f_{-\nu\rho}\rangle$ + H.c.			2162	
$\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu B_6^{*\lambda}f_{+\nu\lambda}^T\rangle$ + H.c.	492	I	937	I	$i\langle\bar{B}_6\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\rho f_{-\nu\lambda}\rangle$ + H.c.			2163	
$\langle\bar{B}_6^{*\mu}f_+{}^{\nu\lambda}B_{6\mu}^* f_{+\nu\lambda}^T\rangle$	493		938		$i\langle\bar{B}_6\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\lambda u_\mu f_{-\nu\rho}\rangle$ + H.c.			2164	
$\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\lambda D_\nu{}^\rho B_6^{*\rho}f_{+\lambda\rho}^T\rangle$ + H.c.	494	I	939	I	$i\langle\bar{B}_6\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\nu h_{\lambda\rho}\rangle$ + H.c.			2165	
$\langle\bar{B}_6^{*\mu}f_+{}^{\nu\lambda}D_\nu{}^\rho B_{6\mu}^* f_{+\lambda\rho}^T\rangle$	495		940		$i\langle\bar{B}_6\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\lambda h_{\nu\rho}\rangle$ + H.c.			2166	
$i\langle\bar{B}_6^{*\mu}f_{+\mu}{}^\nu\sigma_\nu{}^\lambda B_6^{*\rho}f_{+\lambda\rho}^T\rangle$	496		941		$i\langle\bar{B}_6\sigma^{\mu\nu}D^\lambda B_6^{*\rho}\rangle\langle u_\mu u_\rho h_{\nu\lambda}\rangle$ + H.c.			2167	
$\langle\bar{B}_6^{*\mu}B_{6\mu}^*\rangle\langle f_+{}^{\nu\lambda}f_{+\nu\lambda}\rangle$	497	I	942	I	$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 f_{-\mu}{}^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.			2168	I
$\langle\bar{B}_6^{*\mu}B_6^{*\nu}\rangle\langle f_{+\mu}{}^\lambda f_{+\nu\lambda}\rangle$	498		943		$\langle u^\mu u^\nu\rangle\langle\bar{B}_6 f_{-\mu}{}^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.			2169	I
$\langle\bar{B}_6^{*\mu}D^{\nu\lambda}B_{6\mu}^*\rangle\langle f_{+\nu}{}^\rho f_{+\lambda\rho}\rangle$	499	I	944	I	$i\langle u^\mu u^\nu\rangle\langle\bar{B}_6 f_-{}^{\lambda\rho}\sigma_{\mu\lambda}D_\nu B_{6\rho}^*\rangle$ + H.c.			2170	
$\langle\bar{B}_6^{*\mu}D^{\nu\lambda}B_6^{*\rho}\rangle\langle f_{+\mu\nu}f_{+\lambda\rho}\rangle$	500		945		$i\langle u^\mu u^\nu\rangle\langle\bar{B}_6 f_-{}^{\lambda\rho}\sigma_{\mu\lambda}D_\rho B_{6\nu}^*\rangle$ + H.c.			2171	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{6\mu}^* f_{+\nu}{}^\lambda B_{6\lambda}^*\rangle$ + H.c.			946		$\langle u^\mu f_{-\mu}{}^\nu\rangle\langle\bar{B}_6 u^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.			2172	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6^{*\lambda}f_{+\mu\nu}B_{6\lambda}^*\rangle$ + H.c.			947		$\langle u^\mu f_{-\mu}{}^\nu\rangle\langle\bar{B}_6 u^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.			2173	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{6\mu}^* f_+{}^{\lambda\rho}D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			948		$i\langle u^\mu f_-{}^{\nu\lambda}\rangle\langle\bar{B}_6 u^\rho\sigma_{\mu\nu}D_\lambda B_{6\rho}^*\rangle$ + H.c.			2174	
$\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6^{*\lambda}f_{+\mu}{}^\rho D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.			949		$i\langle u^\mu f_-{}^{\nu\lambda}\rangle\langle\bar{B}_6 u^\rho\sigma_{\mu\nu}D_\rho B_{6\lambda}^*\rangle$ + H.c.			2175	
$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_{6\mu}^* f_+{}^{\lambda\rho}\sigma_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	501		950		$\langle\bar{B}_6 u^\mu\nabla_\mu f_-{}^{\nu\lambda}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	1069		2176	
$\langle f_+{}^{\mu\nu}\rangle\langle f_{+\mu\nu}\rangle\langle\bar{B}_6^{*\lambda}B_{6\lambda}^*\rangle$ + H.c.			951		$\langle\bar{B}_6 u^\mu\nabla^\nu f_{-\mu}{}^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	1070		2177	
$\langle f_+{}^{\mu\nu}\rangle\langle f_{+\mu}{}^\lambda\rangle\langle\bar{B}_{6\nu}^* B_{6\lambda}^*\rangle$ + H.c.			952		$\langle\bar{B}_6 u^\mu\nabla^\nu f_{-\nu}{}^\lambda\gamma_5\gamma_\mu B_{6\lambda}^*\rangle$ + H.c.	1071		2178	
$\langle f_+{}^{\mu\nu}\rangle\langle f_{+\mu}{}^\lambda\rangle\langle\bar{B}_6^{*\rho}D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			953		$\langle\bar{B}_6 u^\mu\nabla^\nu f_{-\nu}{}^\lambda\gamma_5\gamma_\lambda B_{6\mu}^*\rangle$ + H.c.	1072		2179	
$\langle f_+{}^{\mu\nu}\rangle\langle f_+{}^\lambda\rangle\langle\bar{B}_{6\mu}^* D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			954		$\langle\bar{B}_6 u^\mu\nabla^\nu f_-{}^{\lambda\rho}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	1073		2180	
$i\langle f_+{}^{\mu\nu}\rangle\langle f_+{}^{\lambda\rho}\rangle\langle\bar{B}_{6\mu}^*\sigma_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			955		$\langle\bar{B}_6 u^\mu\nabla^\nu f_-{}^{\lambda\rho}\gamma_5\gamma_\nu D_{\mu\lambda}B_{6\rho}^*\rangle$ + H.c.	1074		2181	
$i\langle f_+{}^{\mu\nu}f_+{}^{\lambda\rho}\rangle\langle\bar{B}_{6\mu}^*\sigma_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			956		$\langle\bar{B}_6 u^\mu\nabla^\nu f_-{}^{\lambda\rho}\gamma_5\gamma_\lambda D_{\mu\nu}B_{6\rho}^*\rangle$ + H.c.	1075		2182	
$\langle\bar{B}_6^{*\mu}u_\mu u^\nu\chi_+ B_{6\nu}^*\rangle$ + H.c.	502	I	957	I	$\langle\bar{B}_6 u^\mu\nabla^\nu f_-{}^{\lambda\rho}\gamma_5\gamma_\lambda D_{\nu\rho}B_{6\mu}^*\rangle$ + H.c.	1076		2183	
$\langle\bar{B}_6^{*\mu}u^\nu u_\mu\chi_+ B_{6\nu}^*\rangle$ + H.c.	503	I	958		$\langle\bar{B}_6 u^\mu\nabla_\mu h^{\lambda\rho}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	1077		2184	
$\langle\bar{B}_6^{*\mu}u^\nu u_\nu\chi_+ B_{6\mu}^*\rangle$ + H.c.	504		959		$\langle\bar{B}_6 u^\mu\nabla^\nu h^{\lambda\rho}\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.	1078		2185	
$\langle\bar{B}_6^{*\mu}u^\nu u^\lambda\chi_+ D_{\nu\lambda}B_{6\mu}^*\rangle$ + H.c.	505		960		$\langle\bar{B}_6 u^\mu\nabla^\nu h^{\lambda\rho}\gamma_5\gamma_\nu D_{\mu\lambda}B_{6\rho}^*\rangle$ + H.c.	1079		2186	

(Table continued)

TABLE VIII. (Continued)

O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$	O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$
$\langle \bar B_6^{*\mu} u_\mu u^\nu B_6^* \chi_+^T \rangle$	506		961	I	$\langle \bar B_6 u^\mu \nabla^\nu h^{\lambda\rho} \gamma_5\gamma_\nu D_{\lambda\rho} B_{6\mu}^* \rangle$ + H.c.	1080		2187	
$\langle \bar B_6^{*\mu} u^\nu u_\mu B_{6\iota}^* \chi_+^T \rangle$ + H.c.			962		$\langle \bar B_6 u^\mu \gamma_5\gamma_\mu B_6^{*\nu} \nabla^\lambda f_{-\nu\lambda}^T \rangle$ + H.c.	1081		2188	
$\langle \bar B_6^{*\mu} u^\nu u_\nu B_{6\mu}^* \chi_+^T \rangle$ + H.c.			963		$\langle \bar B_6 u^\mu \gamma_5\gamma^\nu B_{6\mu}^* \nabla^\lambda f_{-\nu\lambda}^T \rangle$ + H.c.	1082		2189	
$\langle \bar B_6^{*\mu} u^\nu u^\lambda D_{\nu\lambda} B_{6\mu}^* \chi_+^T \rangle$ + H.c.			964		$\langle \bar B_6 u^\mu \gamma_5\gamma^\nu B_6^{*\lambda} \nabla_\nu f_{-\mu\lambda}^T \rangle$ + H.c.	1083		2190	
$\langle \bar B_6^{*\mu} u_\mu \chi_+ u^\nu B_{6\nu}^* \rangle$	507	I	965	I	$\langle \bar B_6 u^\mu \gamma_5\gamma^\nu B_6^{*\lambda} \nabla_\mu h^T_{\nu\lambda} \rangle$ + H.c.	1084		2191	
$\langle \bar B_6^{*\mu} u^\nu \chi_+ u_\mu B_{6\nu}^* \rangle$	508		966		$\langle \bar B_6 f_-^{\mu\nu} f_{-\mu}^{\ \lambda} \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.	1085		2192	
$\langle \bar B_6^{*\mu} u^\nu \chi_+ u_\nu B_{6\mu}^* \rangle$	509		967		$\langle \bar B_6 f_-^{\mu\nu} f_{-\mu}^{\ \lambda} \gamma_5\gamma_\lambda B_{6\nu}^* \rangle$ + H.c.			2193	
$\langle \bar B_6^{*\mu} u^\nu \chi_+ u^\lambda D_{\nu\lambda} B_{6\mu}^* \rangle$	510		968		$\langle \bar B_6 f_-^{\mu\nu} f_-^{\ \lambda\rho} \gamma_5\gamma_\mu D_{\nu\lambda} B_{6\rho}^* \rangle$ + H.c.			2194	
$\langle \bar B_6^{*\mu} u_\mu \chi_+ B_6^{*\nu} u^T_\nu \rangle$ + H.c.	511	I	969	I	$\langle \bar B_6 f_-^{\mu\nu} h_\mu^{\ \lambda} \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.	1086		2195	
$\langle \bar B_6^{*\mu} u^\nu \chi_+ B_{6\mu}^* u^T_\nu \rangle$ + H.c.	512		970		$\langle \bar B_6 f_-^{\mu\nu} h_\mu^{\ \lambda} \gamma_5\gamma_\lambda B_{6\nu}^* \rangle$ + H.c.	1087		2196	
$\langle \bar B_6^{*\mu} u^\nu \chi_+ B_{6\nu}^* u^T_\mu \rangle$ + H.c.	513		971		$\langle \bar B_6 f_-^{\mu\nu} h^{\lambda\rho} \gamma_5\gamma_\mu D_{\nu\lambda} B_{6\rho}^* \rangle$ + H.c.	1088		2197	
$\langle \bar B_6^{*\mu} u^\nu \chi_+ D_\nu^{\ \lambda} B_{6\mu}^* u^T_\lambda \rangle$ + H.c.	514		972		$\langle \bar B_6 f_-^{\mu\nu} h^{\lambda\rho} \gamma_5\gamma_\mu D_{\lambda\rho} B_{6\nu}^* \rangle$ + H.c.	1089		2198	
$\langle \bar B_6^{*\mu} B_{6\mu}^* \rangle \langle u^\nu u_\nu \chi_+ \rangle$	515		973	I	$\langle \bar B_6 f_-^{\mu\nu} \gamma_5\gamma_\mu B_6^{*\lambda} f^T_{-\nu\lambda} \rangle$ + H.c.	1090		2199	
$\langle \bar B_6^{*\mu} B_6^{*\nu} \rangle \langle u_\mu u_\nu \chi_+ \rangle$	516		974		$\langle \bar B_6 f_-^{\mu\nu} \gamma_5\gamma_\mu B_6^{*\lambda} h^T_{\nu\lambda} \rangle$ + H.c.	1091		2200	
$\langle \bar B_6^{*\mu} B_6^{*\nu} \rangle \langle u_\nu u_\mu \chi_+ \rangle$ + H.c.			975		$\langle \bar B_6 \nabla^\mu f_{-\mu}^{\ \nu} u^\lambda \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.	1092		2201	
$\langle \bar B_6^{*\mu} D^{\nu\lambda} B_{6\mu}^* \rangle \langle u_\nu u_\lambda \chi_+ \rangle$	517		976		$\langle \bar B_6 \nabla^\mu f_{-\mu}^{\ \nu} u^\lambda \gamma_5\gamma_\lambda B_{6\nu}^* \rangle$ + H.c.	1093		2202	
$\langle u^\mu u_\mu \rangle \langle \bar B_6^{*\nu} \chi_+ B_{6\nu}^* \rangle$ + H.c.			977	I	$\langle \bar B_6 \nabla^\mu f_-^{\ \nu\lambda} u_\nu \gamma_5\gamma_\mu B_{6\lambda}^* \rangle$ + H.c.	1094		2203	
$\langle u^\mu u^\nu \rangle \langle \bar B_{6\mu}^* \chi_+ B_{6\nu}^* \rangle$ + H.c.			978		$\langle \bar B_6 h^{\mu\nu} f_{-\mu}^{\ \lambda} \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.	1095		2204	
$\langle u^\mu u^\nu \rangle \langle \bar B_6^{*\lambda} \chi_+ D_{\mu\nu} B_{6\lambda}^* \rangle$ + H.c.			979		$\langle \bar B_6 h^{\mu\nu} h_\mu^{\ \lambda} \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.	1096		2205	
$\langle u^\mu \chi_+ \rangle \langle \bar B_6^{*\nu} u_\mu B_{6\nu}^* \rangle$ + H.c.			980	I	$\langle \bar B_6 h^{\mu\nu} h_\mu^{\ \lambda} \gamma_5\gamma_\lambda B_{6\nu}^* \rangle$ + H.c.	1097		2206	
$\langle u^\mu \chi_+ \rangle \langle \bar B_6^{*\nu} u_\mu B_{6\nu}^* \rangle$ + H.c.			981		$\langle \bar B_6 h^{\mu\nu} \gamma_5\gamma_\mu B_6^{*\lambda} h^T_{\nu\lambda} \rangle$ + H.c.	1098		2207	
$\langle u^\mu \chi_+ \rangle \langle \bar B_6^{*\nu} u^\lambda D_{\mu\lambda} B_{6\nu}^* \rangle$ + H.c.			982		$\langle \bar B_6 \nabla^\mu h^{\nu\lambda} u_\mu \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.	1099		2208	
$\langle \chi_+ \rangle \langle \bar B_6^{*\mu} u_\mu u^\nu B_{6\nu}^* \rangle$ + H.c.			983	I	$\langle u^\mu \nabla_\mu f_-^{\ \nu\lambda} \rangle \langle \bar B_6 \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.			2209	
$\langle \chi_+ \rangle \langle \bar B_6^{*\mu} u^\nu u_\mu B_{6\nu}^* \rangle$ + H.c.			984		$\langle u^\mu \nabla^\nu f_{-\mu}^{\ \lambda} \rangle \langle \bar B_6 \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.			2210	
$\langle \chi_+ \rangle \langle \bar B_6^{*\mu} u^\nu u_\nu B_{6\mu}^* \rangle$ + H.c.			985		$\langle u^\mu \nabla^\nu f_{-\nu}^{\ \lambda} \rangle \langle \bar B_6 \gamma_5\gamma_\mu B_{6\lambda}^* \rangle$ + H.c.			2211	
$\langle \chi_+ \rangle \langle \bar B_6^{*\mu} u^\nu u^\lambda D_{\nu\lambda} B_{6\mu}^* \rangle$ + H.c.			986		$\langle u^\mu \nabla^\nu f_{-\nu}^{\ \lambda} \rangle \langle \bar B_6 \gamma_5\gamma_\lambda B_{6\mu}^* \rangle$ + H.c.			2212	
$\langle \chi_+ \rangle \langle \bar B_6^{*\mu} u_\mu B_6^{*\nu} u^T_\nu \rangle$ + H.c.			987	I	$\langle u^\mu \nabla^\nu f_-^{\ \lambda\rho} \rangle \langle \bar B_6 \gamma_5\gamma_\mu D_{\nu\lambda} B_{6\rho}^* \rangle$ + H.c.			2213	
$\langle \chi_+ \rangle \langle \bar B_6^{*\mu} u^\nu B_{6\mu}^* u^T_\nu \rangle$ + H.c.			988		$\langle u^\mu \nabla^\nu f_-^{\ \lambda\rho} \rangle \langle \bar B_6 \gamma_5\gamma_\nu D_{\mu\lambda} B_{6\rho}^* \rangle$ + H.c.			2214	
$\langle \chi_+ \rangle \langle \bar B_6^{*\mu} u^\nu D_\nu^{\ \lambda} B_{6\mu}^* u^T_\lambda \rangle$ + H.c.			989		$\langle u^\mu \nabla^\nu f_-^{\ \lambda\rho} \rangle \langle \bar B_6 \gamma_5\gamma_\lambda D_{\mu\nu} B_{6\rho}^* \rangle$ + H.c.			2215	
$\langle \bar B_6^{*\mu} u^\nu \nabla^\lambda \chi_+ \gamma_5\gamma_\nu D_\lambda B_{6\mu}^* \rangle$ + H.c.	518		990		$\langle u^\mu \nabla_\mu h^{\nu\lambda} \rangle \langle \bar B_6 \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.			2216	
$\langle \bar B_6^{*\mu} u^\nu \nabla^\lambda \chi_+ \gamma_5\gamma_\lambda D_\nu B_{6\mu}^* \rangle$ + H.c.	519		991		$\langle u^\mu \nabla^\nu h^{\lambda\rho} \rangle \langle \bar B_6 \gamma_5\gamma_\mu D_{\nu\lambda} B_{6\rho}^* \rangle$ + H.c.			2217	
$\langle \bar B_6^{*\mu} f_-^{\ \nu\lambda} \chi_+ \gamma_5\gamma_\nu D_\lambda B_{6\mu}^* \rangle$ + H.c.	520		992		$\langle f_-^{\mu\nu} h_\mu^{\ \lambda} \rangle \langle \bar B_6 \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.			2218	
$\langle \bar B_6^{*\mu} \nabla^\nu \nabla_\nu \chi_+ B_{6\mu}^* \rangle$	521	I	993	I	$\langle h^{\mu\nu} h_\mu^{\ \lambda} \rangle \langle \bar B_6 \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.			2219	
$\langle \nabla^\mu \nabla_\mu \chi_+ \rangle \langle \bar B_6^{*\nu} B_{6\nu}^* \rangle$	522	I	994	I	$i\langle \bar B_6 f_+^{\mu\nu} u_\mu u^\lambda \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.	1100		2220	
$i\langle \bar B_6^{*\mu} f_{+\mu}^{\ \nu} \chi_+ B_{6\nu}^* \rangle$ + H.c.	523		995		$i\langle \bar B_6 f_+^{\mu\nu} u_\mu u^\lambda \gamma_5\gamma_\lambda B_{6\nu}^* \rangle$ + H.c.	1101		2221	
$i\langle \bar B_6^{*\mu} f_{+\mu}^{\ \nu} \chi_+ B_{6\nu}^{*T} \rangle$	524		996		$i\langle \bar B_6 f_+^{\mu\nu} u^\lambda u_\mu \gamma_5\gamma_\nu B_{6\lambda}^* \rangle$ + H.c.	1102		2222	
$i\langle \bar B_6^{*\mu} B_6^{*\nu} \rangle \langle f_{+\mu\nu} \chi_+ \rangle$	525		997		$i\langle \bar B_6 f_+^{\mu\nu} u^\lambda u_\mu \gamma_5\gamma_\lambda B_{6\nu}^* \rangle$ + H.c.	1103		2223	
$i\langle f_+^{\mu\nu} \rangle \langle \bar B_{6\mu}^* \chi_+ B_{6\nu}^* \rangle$	526		998		$i\langle \bar B_6 f_+^{\mu\nu} u^\lambda u_\lambda \gamma_5\gamma_\mu B_{6\nu}^* \rangle$ + H.c.	1104		2224	
$i\langle f_+^{\mu\nu} \rangle \langle \chi_+ \rangle \langle \bar B_{6\mu}^* B_{6\nu}^* \rangle$	527		999		$i\langle \bar B_6 f_+^{\mu\nu} u^\lambda u^\rho \gamma_5\gamma_\mu D_{\nu\lambda} B_{6\rho}^* \rangle$ + H.c.	1105		2225	
$i\langle \chi_+ \rangle \langle \bar B_6^{*\mu} f_{+\mu}^{\ \nu} B_{6\nu}^* \rangle$ + H.c.			1000		$i\langle \bar B_6 f_+^{\mu\nu} u^\lambda u^\rho \gamma_5\gamma_\mu D_{\nu\rho} B_{6\lambda}^* \rangle$ + H.c.	1106		2226	
$\langle \bar B_6^{*\mu} \chi_+^2 B_{6\mu}^* \rangle$	528		1001		$i\langle \bar B_6 f_+^{\mu\nu} u^\lambda u^\rho \gamma_5\gamma_\mu D_{\lambda\rho} B_{6\nu}^* \rangle$ + H.c.	1107		2227	
$\langle \bar B_6^{*\mu} \chi_+ B_{6\mu}^* \chi_+^T \rangle$	529		1002		$i\langle \bar B_6 f_+^{\mu\nu} u^\lambda u^\rho \gamma_5\gamma_\lambda D_{\mu\rho} B_{6\nu}^* \rangle$ + H.c.	1108		2228	
$\langle \bar B_6^{*\mu} B_{6\mu}^* \rangle \langle \chi_+^2 \rangle$	530	I	1003	I	$i\langle \bar B_6 f_+^{\mu\nu} u^\lambda u^\rho \gamma_5\gamma_\rho D_{\mu\lambda} B_{6\nu}^* \rangle$ + H.c.	1109		2229	
$\langle \chi_+ \rangle \langle \bar B_6^{*\mu} \chi_+ B_{6\mu}^* \rangle$ + H.c.			1004		$i\langle \bar B_6 f_+^{\mu\nu} u_\mu \gamma_5\gamma_\nu B_6^{*\lambda} u^T_\lambda \rangle$ + H.c.	1110		2230	
$\langle \chi_+ \rangle \langle \chi_+ \rangle \langle \bar B_6^{*\mu} B_{6\mu}^* \rangle$ + H.c.			1005		$i\langle \bar B_6 f_+^{\mu\nu} u_\mu \gamma_5\gamma^\lambda B_{6\nu}^* u^T_\lambda \rangle$ + H.c.	1111		2231	
$i\langle \bar B_6^{*\mu} u^\nu u^\lambda \chi_- \gamma_5\gamma_\nu D_\lambda B_{6\mu}^* \rangle$ + H.c.	531		1006		$i\langle \bar B_6 f_+^{\mu\nu} u^\lambda \gamma_5\gamma_\mu B_{6\nu}^* u^T_\lambda \rangle$ + H.c.	1112		2232	

(Table continued)

TABLE VIII. (Continued)

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$i\langle\bar{B}_6^{*\mu}u^\nu u^\lambda\chi_-\gamma_5\gamma_\lambda D_\nu B_{6\mu}^*\rangle$ + H.c.			1007		$i\langle\bar{B}_6 f_+^{\mu\nu}u^\lambda\gamma_5\gamma_\mu B_{6\lambda}^* u^T_\nu\rangle$ + H.c.	1113		2233	
$i\langle\bar{B}_6^{*\mu}u^\nu u^\lambda\gamma_5\gamma_\nu D_\lambda B_{6\mu}^*\chi_-^T\rangle$ + H.c.	532		1008		$i\langle\bar{B}_6 f_+^{\mu\nu}u^\lambda\gamma_5\gamma_\lambda B_{6\mu}^* u^T_\nu\rangle$ + H.c.	1114		2234	
$i\langle\bar{B}_6^{*\mu}u^\nu\chi_- u^\lambda\gamma_5\gamma_\nu D_\lambda B_{6\mu}^*\rangle$ + H.c.	533		1009		$i\langle\bar{B}_6 f_+^{\mu\nu}u^\lambda\gamma_5\gamma_\mu D_{\nu\lambda}B_6^{*\rho}u^T_\rho\rangle$ + H.c.	1115		2235	
$i\langle\bar{B}_6^{*\mu}u^\nu\chi_-\gamma_5\gamma_\nu D^\lambda B_{6\mu}^* u^T_\lambda\rangle$ + H.c.	534		1010		$i\langle\bar{B}_6 f_+^{\mu\nu}u^\lambda\gamma_5\gamma_\mu D_\nu^{\ \rho}B_{6\lambda}^* u^T_\rho\rangle$ + H.c.	1116		2236	
$i\langle\bar{B}_6^{*\mu}u^\nu\chi_-\gamma_5\gamma^\lambda D_\nu B_{6\mu}^* u^T_\lambda\rangle$ + H.c.	535		1011		$i\langle\bar{B}_6 f_+^{\mu\nu}u^\lambda\gamma_5\gamma_\mu D_\lambda^{\ \rho}B_{6\nu}^* u^T_\rho\rangle$ + H.c.	1117		2237	
$i\langle\bar{B}_6^{*\mu}\gamma_5\gamma^\nu D^\lambda B_{6\mu}^*\rangle\langle u_\nu u_\lambda\chi_-\rangle$ + H.c.			1012		$i\langle\bar{B}_6 f_+^{\mu\nu}u^\lambda\gamma_5\gamma_\lambda D_\mu^{\ \rho}B_{6\nu}^* u^T_\rho\rangle$ + H.c.	1118		2238	
$i\langle\chi_-\rangle\langle\bar{B}_6^{*\mu}u^\nu u^\lambda\gamma_5\gamma_\nu D_\lambda B_{6\mu}\rangle$ + H.c.			1013		$i\langle\bar{B}_6 f_+^{\mu\nu}u^\lambda\gamma_5\gamma^\rho D_{\mu\lambda}B_{6\nu}^* u^T_\rho\rangle$ + H.c.			2239	
$i\langle\bar{B}_6^{*\mu}u_\mu\nabla^\nu\chi_- B_{6\nu}^*\rangle$ + H.c.	536	I	1014	I	$i\langle\bar{B}_6 f_+^{\mu\nu}\gamma_5\gamma_\mu B_{6\nu}^* u^{T\lambda}u^T_\lambda\rangle$ + H.c.			2240	
$i\langle\bar{B}_6^{*\mu}u^\nu\nabla_\mu\chi_- B_{6\nu}^*\rangle$ + H.c.	537		1015		$i\langle\bar{B}_6 f_+^{\mu\nu}\gamma_5\gamma_\mu B_6^{*\lambda}u^T_\nu u^T_\lambda\rangle$ + H.c.	1119		2241	
$i\langle\bar{B}_6^{*\mu}u^\nu\nabla_\nu\chi_- B_{6\mu}^*\rangle$ + H.c.	538	I	1016	I	$i\langle\bar{B}_6 f_+^{\mu\nu}\gamma_5\gamma_\mu B_6^{*\lambda}u^T_\lambda u^T_\nu\rangle$ + H.c.			2242	
$i\langle\bar{B}_6^{*\mu}u^\nu\nabla^\lambda\chi_- D_{\nu\lambda}B_{6\mu}^*\rangle$ + H.c.	539		1017		$i\langle\bar{B}_6 f_+^{\mu\nu}\gamma_5\gamma^\lambda B_{6\mu}^* u^T_\nu u^T_\lambda\rangle$ + H.c.	1120		2243	
$i\langle\bar{B}_6^{*\mu}u^\nu B_{6\mu}^*\nabla_\nu\chi_-^T\rangle$	540	I	1018	I	$i\langle\bar{B}_6 f_+^{\mu\nu}\gamma_5\gamma^\lambda B_{6\mu}^* u^T_\lambda u^T_\nu\rangle$ + H.c.			2244	
$i\langle\bar{B}_6^{*\mu}B_{6\mu}^*\rangle\langle u^\nu\nabla_\nu\chi_-\rangle$	541	I	1019	I	$i\langle\bar{B}_6 f_+^{\mu\nu}\gamma_5\gamma_\mu D_\nu^{\ \lambda}B_6^{*\rho}u^T_\lambda u^T_\rho\rangle$ + H.c.	1121		2245	
$i\langle\bar{B}_6^{*\mu}B_6^{*\nu}\rangle\langle u_\mu\nabla_\nu\chi_-\rangle$ + H.c.			1020		$i\langle\bar{B}_6 f_+^{\mu\nu}\gamma_5\gamma_\mu D_\nu^{\ \lambda}B_6^{*\rho}u^T_\rho u^T_\lambda\rangle$ + H.c.			2246	
$i\langle\bar{B}_6^{*\mu}D^{\nu\lambda}B_{6\mu}^*\rangle\langle u_\nu\nabla_\lambda\chi_-\rangle$ + H.c.			1021		$i\langle\bar{B}_6 f_+^{\mu\nu}\gamma_5\gamma_\mu D^{\lambda\rho}B_{6\nu}^* u^T_\lambda u^T_\rho\rangle$ + H.c.			2247	
$i\langle\nabla^\mu\chi_-\rangle\langle\bar{B}_6^{*\nu}u_\mu B_{6\nu}^*\rangle$ + H.c.			1022	I	$i\langle\bar{B}_6 f_+^{\mu\nu}\gamma_5\gamma^\lambda D_\mu^{\ \rho}B_{6\nu}^* u^T_\lambda u^T_\rho\rangle$ + H.c.	1122		2248	
$\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}\chi_-\gamma_5\gamma_\nu D_\lambda B_{6\mu}^*\rangle$ + H.c.	542		1023		$i\langle\bar{B}_6 f_+^{\mu\nu}\gamma_5\gamma^\lambda D_\mu^{\ \rho}B_{6\nu}^* u^T_\rho u^T_\lambda\rangle$ + H.c.			2249	
$\langle\bar{B}_6^{*\mu}f_+^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda B_{6\mu}^*\chi_-^T\rangle$	543		1024		$i\langle\bar{B}_6 u^\mu f_{+\mu}^{\ \ \nu}u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	1123		2250	
$\langle f_+^{\mu\nu}\rangle\langle\bar{B}_6^{*\lambda}\chi_-\gamma_5\gamma_\mu D_\nu B_{6\lambda}^*\rangle$	544		1025		$i\langle\bar{B}_6 u^\mu f_{+\mu}^{\ \ \nu}u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.	1124		2251	
$\langle f_+^{\mu\nu}\rangle\langle\chi_-\rangle\langle\bar{B}_6^{*\lambda}\gamma_5\gamma_\mu D_\nu B_{6\lambda}^*\rangle$	545		1026		$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}u_\mu\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.	1125		2252	
$\langle f_+^{\mu\nu}\chi_-\rangle\langle\bar{B}_6^{*\lambda}\gamma_5\gamma_\mu D_\nu B_{6\lambda}^*\rangle$	546		1027		$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}u_\nu\gamma_5\gamma_\mu B_{6\lambda}^*\rangle$ + H.c.	1126		2253	
$\langle\chi_-\rangle\langle\bar{B}_6^{*\mu}f_+^{\ \nu}\gamma_5\gamma_\nu D_\lambda B_{6\mu}^*\rangle$ + H.c.			1028		$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}u_\nu\gamma_5\gamma_\lambda B_{6\mu}^*\rangle$ + H.c.	1127		2254	
$\langle\bar{B}_6^{*\mu}\chi_-^2 B_{6\mu}^*\rangle$	547		1029		$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}u^\rho\gamma_5\gamma_\mu D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.	1128		2255	
$\langle\bar{B}_6^{*\mu}\chi_- B_{6\mu}^*\chi_-^T\rangle$	548	I	1030	I	$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}u^\rho\gamma_5\gamma_\nu D_{\mu\lambda}B_{6\rho}^*\rangle$ + H.c.	1129		2256	
$\langle\chi_-\rangle\langle\bar{B}_6^{*\mu}\chi_- B_{6\mu}^*\rangle$	549	I	1031	I	$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}u^\rho\gamma_5\gamma_\nu D_{\mu\rho}B_{6\lambda}^*\rangle$ + H.c.	1130		2257	
$\langle\chi_-\rangle\langle\chi_-\rangle\langle\bar{B}_6^{*\mu}B_{6\mu}^*\rangle$ + H.c.			1032		$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}u^\rho\gamma_5\gamma_\nu D_{\lambda\rho}B_{6\mu}^*\rangle$ + H.c.	1131		2258	
$\langle\bar{B}_6^{*\mu}B_6^{*\nu}\rangle\langle F_{L\mu}^{\ \lambda}F_{\mu\nu\lambda}\rangle$ + P.	550	I	1033	I	$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}u^\rho\gamma_5\gamma_\rho D_{\mu\nu}B_{6\lambda}^*\rangle$ + H.c.	1132		2259	
$\langle\bar{B}_6^{*\mu}B_{6\mu}^*\rangle\langle F_L^{\nu\lambda}F_{L\nu\lambda}\rangle$ + P.	551		1034		$i\langle\bar{B}_6 u^\mu f_{+\mu}^{\ \ \nu}\gamma_5\gamma_\nu B_6^{*\lambda}u^T_\lambda\rangle$ + H.c.	1133		2260	
$\langle\bar{B}_6^{*\mu}D^{\nu\lambda}B_6^{*\rho}\rangle\langle F_{L\mu\nu}F_{L\lambda\rho}\rangle$ + P.	552	I	1035	I	$i\langle\bar{B}_6 u^\mu f_{+\mu}^{\ \ \nu}\gamma_5\gamma^\lambda B_{6\nu}^* u^T_\lambda\rangle$ + H.c.	1134		2261	
$\langle\bar{B}_6^{*\mu}D^{\nu\lambda}B_{6\mu}^*\rangle\langle F_{L\nu}^{\ \rho}F_{L\lambda\rho}\rangle$ + P.	553		1036		$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}\gamma_5\gamma_\mu B_{6\nu}^* u^T_\lambda\rangle$ + H.c.	1135		2262	
$i\langle F_L^{\mu\nu}F_L^{\lambda\rho}\rangle\langle\bar{B}_{6\mu}^*\sigma_{\nu\lambda}B_{6\rho}^*\rangle$ + P.	554		1037		$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}\gamma_5\gamma_\nu B_{6\mu}^* u^T_\lambda\rangle$ + H.c.	1136		2263	
$\langle F_L^{\mu\nu}\rangle\langle F_{L\mu}^{\ \lambda}\rangle\langle\bar{B}_{6\nu}^* B_{6\lambda}^*\rangle$ + P.	555	I			$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}\gamma_5\gamma_\nu B_{6\lambda}^* u^T_\mu\rangle$ + H.c.	1137		2264	
$\langle F_L^{\mu\nu}\rangle\langle F_{L\mu\nu}\rangle\langle\bar{B}_6^{*\lambda}B_{6\lambda}^*\rangle$ + P.	556				$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}\gamma_5\gamma_\nu D_{\mu\lambda}B_6^{*\rho}u^T_\rho\rangle$ + H.c.	1138		2265	
$\langle F_L^{\mu\nu}\rangle\langle F_L^{\lambda\rho}\rangle\langle\bar{B}_{6\mu}^* D_{\nu\lambda}B_{6\rho}^*\rangle$ + P.	557	I			$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}\gamma_5\gamma_\nu D_\mu^{\ \rho}B_{6\lambda}^* u^T_\rho\rangle$ + H.c.	1139		2266	
$\langle F_L^{\mu\nu}\rangle\langle F_{L\mu}^{\ \lambda}\rangle\langle\bar{B}_6^{*\rho}D_{\nu\lambda}B_{6\rho}^*\rangle$ + P.	558				$i\langle\bar{B}_6 u^\mu f_+^{\nu\lambda}\gamma_5\gamma_\nu D_\lambda^{\ \rho}B_{6\mu}^* u^T_\rho\rangle$ + H.c.	1140		2267	
$i\langle F_L^{\mu\nu}\rangle\langle F_L^{\lambda\rho}\rangle\langle\bar{B}_{6\mu}^*\sigma_{\nu\lambda}B_{6\rho}^*\rangle$ + P.	559				$i\langle\bar{B}_6 u^\mu u_\mu f_+^{\nu\lambda}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			2268	
$\langle\bar{B}_6^{*\mu}B_{6\mu}^*\rangle\langle\chi\chi^\dagger\rangle$	560		1038		$i\langle\bar{B}_6 u^\mu u^\nu f_{+\mu}^{\ \ \lambda}\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			2269	
$\langle\bar{B}_6^{*\mu}\det\chi B_{6\mu}^*\rangle$ + H.c.	561				$i\langle\bar{B}_6 u^\mu u^\nu f_{+\mu}^{\ \ \lambda}\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			2270	
$\langle\bar{B}_{\bar{3}}u^\mu u_\mu u^\nu u_\nu B_6\rangle$ + H.c.			1039		$i\langle\bar{B}_6 u^\mu u^\nu f_{+\nu}^{\ \ \lambda}\gamma_5\gamma_\mu B_{6\lambda}^*\rangle$ + H.c.			2271	
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u_\mu u_\nu B_6\rangle$ + H.c.			1040		$i\langle\bar{B}_6 u^\mu u^\nu f_{+\nu}^{\ \ \lambda}\gamma_5\gamma_\lambda B_{6\mu}^*\rangle$ + H.c.			2272	
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u_\nu u_\mu B_6\rangle$ + H.c.			1041		$i\langle\bar{B}_6 u^\mu u^\nu f_+^{\ \lambda\rho}\gamma_5\gamma_\nu D_{\mu\nu}B_{6\rho}^*\rangle$ + H.c.			2273	
$\langle\bar{B}_{\bar{3}}u^\mu u_\mu u^\nu u^\lambda D_{\nu\lambda}B_6\rangle$ + H.c.			1042		$i\langle\bar{B}_6 u^\mu u^\nu f_+^{\ \lambda\rho}\gamma_5\gamma_\lambda D_{\mu\rho}B_{6\nu}^*\rangle$ + H.c.			2274	
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u_\mu u^\lambda D_{\nu\lambda}B_6\rangle$ + H.c.	562		1043		$i\langle\bar{B}_6 u^\mu u^\nu f_+^{\ \lambda\rho}\gamma_5\gamma_\lambda D_{\nu\rho}B_{6\mu}^*\rangle$ + H.c.			2275	
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u_\nu u^\lambda D_{\mu\lambda}B_6\rangle$ + H.c.			1044		$i\langle\bar{B}_6\gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle f_{+\mu\nu}u^\lambda u_\lambda\rangle$ + H.c.	1141		2276	
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u^\lambda u_\mu D_{\nu\lambda}B_6\rangle$ + H.c.			1045		$i\langle\bar{B}_6\gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle f_{+\mu}^{\ \lambda}u_\nu u_\lambda\rangle$ + H.c.	1142		2277	
$\langle\bar{B}_{\bar{3}}u^\mu u^\nu u^\lambda u_\nu D_{\mu\lambda}B_6\rangle$ + H.c.			1046		$i\langle\bar{B}_6\gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle f_{+\mu}^{\ \lambda}u_\lambda u_\nu\rangle$ + H.c.			2278	

(Table continued)

TABLE VIII. (Continued)

O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$	O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$
$\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda u_\lambda D_{\mu\nu}B_6\rangle$ + H.c.			1047		$i\langle\bar{B}_6\gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle f_{+\nu}{}^\lambda u_\mu u_\lambda\rangle$ + H.c.	1143		2279	
$\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda u^\rho D_{\mu\nu\lambda\rho}B_6\rangle$ + H.c.			1048		$i\langle\bar{B}_6\gamma_5\gamma^\mu B_6^{*\nu}\rangle\langle f_{+\nu}{}^\lambda u_\lambda u_\mu\rangle$ + H.c.			2280	
$i\langle\bar{B}_{\bar 3}u^\mu u_\mu u^\nu u^\lambda\sigma_{\nu\lambda}B_6\rangle$ + H.c.	563	I	1049	I	$i\langle\bar{B}_6\gamma_5\gamma^\mu D^{\nu\lambda}B_6^{*\rho}\rangle\langle f_{+\mu\nu}u_\lambda u_\rho\rangle$ + H.c.	1144		2281	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u_\mu u^\lambda\sigma_{\nu\lambda}B_6\rangle$ + H.c.	564	I	1050	I	$i\langle\bar{B}_6\gamma_5\gamma^\mu D^{\nu\lambda}B_6^{*\rho}\rangle\langle f_{+\mu\nu}u_\rho u_\lambda\rangle$ + H.c.			2282	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u_\nu u^\lambda\sigma_{\mu\lambda}B_6\rangle$ + H.c.			1051	I	$i\langle\bar{B}_6\gamma_5\gamma^\mu D^{\nu\lambda}B_6^{*\rho}\rangle\langle f_{+\mu\rho}u_\nu u_\lambda\rangle$ + H.c.	1145		2283	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda u_\mu\sigma_{\nu\lambda}B_6\rangle$ + H.c.			1052	I	$i\langle\bar{B}_6\gamma_5\gamma^\mu D^{\nu\lambda}B_6^{*\rho}\rangle\langle f_{+\nu\rho}u_\mu u_\lambda\rangle$ + H.c.	1146		2284	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda u_\nu\sigma_{\mu\lambda}B_6\rangle$ + H.c.			1053	I	$i\langle\bar{B}_6\gamma_5\gamma^\mu D^{\nu\lambda}B_6^{*\rho}\rangle\langle f_{+\nu\rho}u_\lambda u_\mu\rangle$ + H.c.			2285	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda u_\lambda\sigma_{\mu\nu}B_6\rangle$ + H.c.			1054	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u_\mu u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			2286	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda u^\rho\sigma_{\mu\nu}D_{\lambda\rho}B_6\rangle$ + H.c.	565	I	1055	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u_\mu u^\lambda\gamma_5\gamma_\lambda B_{6\lambda}^*\rangle$ + H.c.			2287	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda u^\rho\sigma_{\mu\lambda}D_{\nu\rho}B_6\rangle$ + H.c.	566	I	1056	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda u_\mu\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			2288	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda u^\rho\sigma_{\mu\rho}D_{\nu\lambda}B_6\rangle$ + H.c.			1057	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda u_\mu\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			2289	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda u^\rho\sigma_{\nu\lambda}D_{\mu\rho}B_6\rangle$ + H.c.			1058	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda u_\lambda\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			2290	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda u^\rho\sigma_{\nu\rho}D_{\mu\lambda}B_6\rangle$ + H.c.			1059	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda u^\rho\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			2291	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda u^\rho\sigma_{\lambda\rho}D_{\mu\nu}B_6\rangle$ + H.c.			1060	I	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda u^\rho\gamma_5\gamma_\mu D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.			2292	
$\langle\bar{B}_{\bar 3}u^\mu u_\mu u^\nu B_6 u^T_\nu\rangle$ + H.c.			1061		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda u^\rho\gamma_5\gamma_\mu D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			2293	
$\langle\bar{B}_{\bar 3}u^\mu u^\nu u_\mu B_6 u^T_\nu\rangle$ + H.c.			1062		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda u^\rho\gamma_5\gamma_\lambda D_{\mu\rho}B_{6\nu}^*\rangle$ + H.c.			2294	
$\langle\bar{B}_{\bar 3}u^\mu u^\nu u_\nu B_6 u^T_\mu\rangle$ + H.c.			1063		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda u^\rho\gamma_5\gamma_\rho D_{\mu\lambda}B_{6\nu}^*\rangle$ + H.c.			2295	
$\langle\bar{B}_{\bar 3}u^\mu u_\mu u^\nu D_\nu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.			1064		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u_\mu\gamma_5\gamma_\nu B_6^{*\lambda}u^T_\lambda\rangle$ + H.c.			2296	
$\langle\bar{B}_{\bar 3}u^\mu u^\nu u_\mu D_\nu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.	567		1065		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u_\mu\gamma_5\gamma^\lambda B_{6\nu}^* u^T_\lambda\rangle$ + H.c.			2297	
$\langle\bar{B}_{\bar 3}u^\mu u^\nu u_\nu D_\mu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.			1066		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda\gamma_5\gamma_\mu B_{6\nu}^* u^T_\lambda\rangle$ + H.c.			2298	
$\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda D_{\mu\nu} B_6 u^T_\lambda\rangle$ + H.c.			1067		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda\gamma_5\gamma_\mu D_{\nu\lambda}B_6^{*\rho}u^T_\rho\rangle$ + H.c.			2299	
$\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda D_{\mu\lambda} B_6 u^T_\nu\rangle$ + H.c.			1068		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda\gamma_5\gamma_\mu D_\lambda{}^\rho B_{6\nu}^* u^T_\rho\rangle$ + H.c.			2300	
$\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda D_{\nu\lambda} B_6 u^T_\mu\rangle$ + H.c.			1069		$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{B}_6 u^\lambda\gamma_5\gamma_\lambda D_\mu{}^\rho B_{6\nu}^* u^T_\rho\rangle$ + H.c.			2301	
$\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda D_{\mu\nu\lambda\rho} B_6 u^T_\rho\rangle$ + H.c.			1070		$i\langle f_+{}^{\mu\nu}\rangle\langle u_\mu u^\lambda\rangle\langle\bar{B}_6\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			2302	
$i\langle\bar{B}_{\bar 3}u^\mu u_\mu u^\nu\sigma_\nu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.	568	I	1071	I	$i\langle f_+{}^{\mu\nu}\rangle\langle u_\mu u^\lambda\rangle\langle\bar{B}_6\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			2303	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u_\mu\sigma_\nu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.	569	I	1072	I	$i\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u_\lambda\rangle\langle\bar{B}_6\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			2304	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u_\nu\sigma_\mu{}^\lambda B_6 u^T_\lambda\rangle$ + H.c.			1073	I	$i\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u^\rho\rangle\langle\bar{B}_6\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			2305	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda\sigma_{\mu\nu} B_6 u^T_\lambda\rangle$ + H.c.			1074	I	$i\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u^\rho\rangle\langle\bar{B}_6\gamma_5\gamma_\mu D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			2306	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda\sigma_{\mu\lambda} B_6 u^T_\nu\rangle$ + H.c.			1075	I	$i\langle f_+{}^{\mu\nu}\rangle\langle u^\lambda u^\rho\rangle\langle\bar{B}_6\gamma_5\gamma_\lambda D_{\mu\rho}B_{6\nu}^*\rangle$ + H.c.			2307	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda\sigma_{\nu\lambda} B_6 u^T_\mu\rangle$ + H.c.			1076		$i\langle f_+{}^{\mu\nu}u_\mu\rangle\langle\bar{B}_6 u^\lambda\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			2308	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda\sigma_{\mu\nu}D_\lambda{}^\rho B_6 u^T_\rho\rangle$ + H.c.	570	I	1077	I	$i\langle f_+{}^{\mu\nu}u_\mu\rangle\langle\bar{B}_6 u^\lambda\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			2309	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda\sigma_{\mu\lambda}D_\nu{}^\rho B_6 u^T_\rho\rangle$ + H.c.			1078	I	$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_6 u_\mu\gamma_5\gamma_\nu B_{6\lambda}^*\rangle$ + H.c.			2310	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda\sigma_\mu{}^\rho D_{\nu\lambda} B_6 u^T_\rho\rangle$ + H.c.	571	I	1079	I	$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_6 u_\mu\gamma_5\gamma_\lambda B_{6\nu}^*\rangle$ + H.c.			2311	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda\sigma_{\nu\lambda}D_\mu{}^\rho B_6 u^T_\rho\rangle$ + H.c.			1080	I	$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_6 u_\lambda\gamma_5\gamma_\mu B_{6\nu}^*\rangle$ + H.c.			2312	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda\sigma_\nu{}^\rho D_{\mu\lambda} B_6 u^T_\rho\rangle$ + H.c.			1081	I	$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_6 u^\rho\gamma_5\gamma_\mu D_{\nu\lambda}B_{6\rho}^*\rangle$ + H.c.			2313	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu u^\lambda\sigma_\lambda{}^\rho D_{\mu\nu} B_6 u^T_\rho\rangle$ + H.c.			1082	I	$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_6 u^\rho\gamma_5\gamma_\mu D_{\nu\rho}B_{6\lambda}^*\rangle$ + H.c.			2314	
$\langle\bar{B}_{\bar 3}u^\mu u_\mu D^{\nu\lambda} B_6 u^T_\nu u^T_\lambda\rangle$ + H.c.			1083		$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_6 u^\rho\gamma_5\gamma_\mu D_{\lambda\rho}B_{6\nu}^*\rangle$ + H.c.			2315	
$\langle\bar{B}_{\bar 3}u^\mu u^\nu D_\mu{}^\lambda B_6 u^T_\lambda u^T_\nu\rangle$ + H.c.			1084		$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_6 u^\rho\gamma_5\gamma_\mu D_{\mu\rho}B_{6\nu}^*\rangle$ + H.c.			2316	
$i\langle\bar{B}_{\bar 3}u^\mu u_\mu\sigma^{\nu\lambda} B_6 u^T_\nu u^T_\lambda\rangle$ + H.c.			1085	I	$i\langle f_+{}^{\mu\nu}u^\lambda\rangle\langle\bar{B}_6 u^\rho\gamma_5\gamma_\rho D_{\mu\lambda}B_{6\nu}^*\rangle$ + H.c.			2317	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu\sigma_\mu{}^\lambda B_6 u^T_\nu u^T_\lambda\rangle$ + H.c.	572	I	1086	I	$i\langle\bar{B}_6 f_+{}^{\mu\nu} f_{-\mu}{}^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.	1147		2318	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu\sigma_\mu{}^\lambda B_6 u^T_\lambda u^T_\nu\rangle$ + H.c.			1087	I	$i\langle\bar{B}_6 f_+{}^{\mu\nu} f_{-\mu}{}^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.	1148		2319	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu\sigma_\nu{}^\lambda B_6 u^T_\lambda u^T_\mu\rangle$ + H.c.			1088	I	$\langle\bar{B}_6 f_+{}^{\mu\nu} f_-{}^{\lambda\rho}\sigma_{\mu\nu} D_\lambda B_{6\rho}^*\rangle$ + H.c.	1149		2320	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu\sigma_{\mu\nu}D^{\lambda\rho} B_6 u^T_\lambda u^T_\rho\rangle$ + H.c.			1089	I	$\langle\bar{B}_6 f_+{}^{\mu\nu} f_-{}^{\lambda\rho}\sigma_{\mu\lambda} D_\nu B_{6\rho}^*\rangle$ + H.c.	1150		2321	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu\sigma_\mu{}^\lambda D_\nu{}^\rho B_6 u^T_\lambda u^T_\rho\rangle$ + H.c.	573	I	1090	I	$i\langle\bar{B}_6 f_+{}^{\mu\nu} h_\mu{}^\lambda D_\nu B_{6\lambda}^*\rangle$ + H.c.	1151		2322	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu\sigma_\mu{}^\lambda D_\nu{}^\rho B_6 u^T_\rho u^T_\lambda\rangle$ + H.c.			1091	I	$i\langle\bar{B}_6 f_+{}^{\mu\nu} h_\mu{}^\lambda D_\lambda B_{6\nu}^*\rangle$ + H.c.	1152		2323	
$i\langle\bar{B}_{\bar 3}u^\mu u^\nu\sigma_\nu{}^\lambda D_\mu{}^\rho B_6 u^T_\lambda u^T_\rho\rangle$ + H.c.			1092	I	$i\langle\bar{B}_6 f_+{}^{\mu\nu} h^{\lambda\rho} D_{\mu\lambda\rho} B_{6\nu}^*\rangle$ + H.c.	1153		2324	
$\langle\bar{B}_{\bar 3}u^\mu D_\mu{}^\nu B_6\rangle\langle u_\nu u^\lambda u_\lambda\rangle$ + H.c.			1093		$\langle\bar{B}_6 f_+{}^{\mu\nu} h^{\lambda\rho}\sigma_{\mu\nu} D_\lambda B_{6\rho}^*\rangle$ + H.c.	1154		2325	
$\langle\bar{B}_{\bar 3}B_6\rangle\langle u^\mu u_\mu\rangle\langle u^\nu u_\nu\rangle$ + H.c.			1094		$\langle\bar{B}_6 f_+{}^{\mu\nu} h^{\lambda\rho}\sigma_{\mu\lambda} D_\nu B_{6\rho}^*\rangle$ + H.c.	1155		2326	

(Table continued)

TABLE VIII. (Continued)

O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$	O_n	SU(2)	$\tilde{e}_n^{(4)}$	SU(3)	$\tilde{E}_n^{(4)}$
$\langle \bar{B}_{\bar{3}} B_6\rangle\langle u^\mu u^\nu\rangle\langle u_\mu u_\nu\rangle + \text{H.c.}$			1095		$i\langle \bar{B}_6 f_+^{\mu\nu} D_\mu B_6^{*\lambda} f^T_{-\nu\lambda}\rangle + \text{H.c.}$	1156		2327	
$\langle \bar{B}_{\bar{3}} D^{\mu\nu} B_6\rangle\langle u_\mu u_\nu\rangle\langle u^\lambda u_\lambda\rangle + \text{H.c.}$			1096		$i\langle \bar{B}_6 f_+^{\mu\nu} D^\lambda B_{6\mu}^* f^T_{-\nu\lambda}\rangle + \text{H.c.}$	1157		2328	
$\langle \bar{B}_{\bar{3}} D^{\mu\nu} B_6\rangle\langle u_\mu u^\lambda\rangle\langle u_\nu u_\lambda\rangle + \text{H.c.}$			1097		$\langle \bar{B}_6 f_+^{\mu\nu} \sigma_{\mu\lambda} D_\nu B_6^{*\rho} f^T_{-\lambda\rho}\rangle + \text{H.c.}$	1158		2329	
$\langle \bar{B}_{\bar{3}} D^{\mu\nu\lambda\rho} B_6\rangle\langle u_\mu u_\nu\rangle\langle u_\lambda u_\rho\rangle + \text{H.c.}$			1098		$i\langle \bar{B}_6 \nabla^\mu f_{+\mu}{}^\nu u^\lambda D_\nu B_{6\lambda}^*\rangle + \text{H.c.}$	1159		2330	
$i\langle u^\mu u_\mu\rangle\langle \bar{B}_{\bar{3}} u^\nu u^\lambda \sigma_{\nu\lambda} B_6\rangle + \text{H.c.}$			1099	I	$i\langle \bar{B}_6 \nabla^\mu f_{+\mu}{}^\nu u^\lambda D_\lambda B_{6\nu}^*\rangle + \text{H.c.}$	1160		2331	
$i\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} u_\mu u^\lambda \sigma_{\nu\lambda} B_6\rangle + \text{H.c.}$			1100	I	$i\langle \bar{B}_6 \nabla^\mu f_{+\mu}{}^\nu D_\nu B_6^{*\lambda} u^T_\lambda\rangle + \text{H.c.}$	1161		2332	
$i\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} u^\lambda u^\rho \sigma_{\mu\lambda} D_{\nu\rho} B_6\rangle + \text{H.c.}$			1101	I	$i\langle \bar{B}_6 \nabla^\mu f_{+\mu}{}^\nu D^\lambda B_{6\nu}^* u^T_\lambda\rangle + \text{H.c.}$	1162		2333	
$i\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} u^\lambda u^\rho \sigma_{\mu\rho} D_{\nu\lambda} B_6\rangle + \text{H.c.}$			1102	I	$i\langle \bar{B}_6 u^\mu \nabla_\mu f_+^{\nu\lambda} D_\nu B_{6\lambda}^*\rangle + \text{H.c.}$	1163		2334	
$i\langle u^\mu u_\mu\rangle\langle \bar{B}_{\bar{3}} u^\nu \sigma_\nu{}^\lambda B_6 u^T_\lambda\rangle + \text{H.c.}$			1103	I	$i\langle \bar{B}_6 u^\mu \nabla^\nu f_{+\mu}{}^\lambda D_\nu B_{6\lambda}^*\rangle + \text{H.c.}$	1164		2335	
$i\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} u^\lambda \sigma_{\mu\lambda} D_\nu{}^\rho B_6 u^T_\rho\rangle + \text{H.c.}$			1104	I	$i\langle \bar{B}_6 u^\mu \nabla^\nu f_{+\nu}{}^\lambda D_\mu B_{6\lambda}^*\rangle + \text{H.c.}$	1165		2336	
$\langle \bar{B}_{\bar{3}} u^\mu u_\mu f_-^{\nu\lambda} \gamma_5\gamma_\nu D_\lambda B_6\rangle + \text{H.c.}$	574	I	1105	I	$i\langle \bar{B}_6 u^\mu \nabla^\nu f_{+\nu}{}^\lambda D_\lambda B_{6\mu}^*\rangle + \text{H.c.}$	1166		2337	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu f_{-\mu}{}^\lambda \gamma_5\gamma_\nu D_\lambda B_6\rangle + \text{H.c.}$	575	I	1106	I	$i\langle \bar{B}_6 u^\mu \nabla^\nu f_+^{\lambda\rho} \sigma_{\mu\nu} D_\lambda B_{6\rho}^*\rangle + \text{H.c.}$	1167		2338	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu f_{-\mu}{}^\lambda \gamma_5\gamma_\lambda D_\nu B_6\rangle + \text{H.c.}$	576	I	1107	I	$\langle \bar{B}_6 u^\mu \nabla^\nu f_+^{\lambda\rho} \sigma_{\mu\lambda} D_\nu B_{6\rho}^*\rangle + \text{H.c.}$	1168		2339	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu f_{-\nu}{}^\lambda \gamma_5\gamma_\mu D_\lambda B_6\rangle + \text{H.c.}$	577	I	1108	I	$\langle \bar{B}_6 u^\mu \nabla^\nu f_+^{\lambda\rho} \sigma_{\nu\lambda} D_\mu B_{6\rho}^*\rangle + \text{H.c.}$	1169		2340	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu f_{-\nu}{}^\lambda \gamma_5\gamma_\lambda D_\mu B_6\rangle + \text{H.c.}$	578	I	1109	I	$i\langle \bar{B}_6 f_-^{\mu\nu} f_{+\mu}{}^\lambda D_\nu B_{6\lambda}^*\rangle + \text{H.c.}$	1170		2341	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu f_-^{\lambda\rho} \gamma_5\gamma_\lambda D_{\mu\nu\rho} B_6\rangle + \text{H.c.}$	579	I	1110	I	$i\langle \bar{B}_6 f_-^{\mu\nu} f_{+\mu}{}^\lambda D_\lambda B_{6\nu}^*\rangle + \text{H.c.}$	1171		2342	
$\langle \bar{B}_{\bar{3}} u^\mu u_\mu h^{\nu\lambda} \gamma_5\gamma_\nu D_\lambda B_6\rangle + \text{H.c.}$			1111	I	$i\langle \bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle f_{+\mu}{}^\lambda f_{-\nu\lambda}\rangle + \text{H.c.}$	1172		2343	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu h_\mu{}^\lambda \gamma_5\gamma_\nu D_\lambda B_6\rangle + \text{H.c.}$	580	I	1112	I	$i\langle \bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle f_{+\nu}{}^\lambda f_{-\mu\lambda}\rangle + \text{H.c.}$	1173		2344	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu h_\mu{}^\lambda \gamma_5\gamma_\lambda D_\nu B_6\rangle + \text{H.c.}$	581	I	1113	I	$i\langle \bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle f_{+\mu}{}^\lambda h_{\nu\lambda}\rangle + \text{H.c.}$			2345	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu h_\nu{}^\lambda \gamma_5\gamma_\mu D_\lambda B_6\rangle + \text{H.c.}$			1114	I	$i\langle \bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle f_{+\nu}{}^\lambda h_{\mu\lambda}\rangle + \text{H.c.}$			2346	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu h_\nu{}^\lambda \gamma_5\gamma_\lambda D_\mu B_6\rangle + \text{H.c.}$	582	I	1115	I	$i\langle \bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle \nabla^\lambda f_{+\mu\lambda} u_\nu\rangle + \text{H.c.}$	1174		2347	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu h^{\lambda\rho} \gamma_5\gamma_\mu D_{\nu\lambda\rho} B_6\rangle + \text{H.c.}$	583	I	1116	I	$i\langle \bar{B}_6 D^\mu B_6^{*\nu}\rangle\langle \nabla^\lambda f_{+\nu\lambda} u_\mu\rangle + \text{H.c.}$	1175		2348	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu h^{\lambda\rho} \gamma_5\gamma_\nu D_{\mu\lambda\rho} B_6\rangle + \text{H.c.}$			1117	I	$i\langle \bar{B}_6 D^{\mu\nu\lambda} B_6^{*\rho}\rangle\langle f_{+\mu\rho} h_{\nu\lambda}\rangle + \text{H.c.}$			2349	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu h^{\lambda\rho} \gamma_5\gamma_\lambda D_{\mu\nu\rho} B_6\rangle + \text{H.c.}$			1118	I	$i\langle f_+^{\mu\nu}\rangle\langle \bar{B}_6 f_{-\mu}{}^\lambda D_\nu B_{6\lambda}^*\rangle + \text{H.c.}$			2350	
$\langle \bar{B}_{\bar{3}} u^\mu u_\mu \gamma_5\gamma^\nu D^\lambda B_6 f^T_{-\nu\lambda}\rangle + \text{H.c.}$			1119	I	$i\langle f_+^{\mu\nu}\rangle\langle \bar{B}_6 f_{-\mu}{}^\lambda D_\lambda B_{6\nu}^*\rangle + \text{H.c.}$			2351	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5\gamma_\mu D^\lambda B_6 f^T_{-\nu\lambda}\rangle + \text{H.c.}$	584	I	1120	I	$\langle f_+^{\mu\nu}\rangle\langle \bar{B}_6 f_-^{\lambda\rho} \sigma_{\mu\lambda} D_\nu B_{6\rho}^*\rangle + \text{H.c.}$	1176		2352	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5\gamma_\nu D^\lambda B_6 f^T_{-\mu\lambda}\rangle + \text{H.c.}$			1121	I	$\langle f_+^{\mu\nu} f_-^{\lambda\rho}\rangle\langle \bar{B}_6 \sigma_{\mu\nu} D_\lambda B_{6\rho}^*\rangle + \text{H.c.}$			2353	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5\gamma^\lambda D_\mu B_6 f^T_{-\nu\lambda}\rangle + \text{H.c.}$	585	I	1122	I	$\langle f_+^{\mu\nu} f_-^{\lambda\rho}\rangle\langle \bar{B}_6 \sigma_{\mu\lambda} D_\nu B_{6\rho}^*\rangle + \text{H.c.}$			2354	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5\gamma^\lambda D_\nu B_6 f^T_{-\mu\lambda}\rangle + \text{H.c.}$			1123	I	$\langle f_+^{\mu\nu} h^{\lambda\rho}\rangle\langle \bar{B}_6 \sigma_{\mu\nu} D_\lambda B_{6\rho}^*\rangle + \text{H.c.}$			2355	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5\gamma^\lambda D_\mu B_6 h^T_{\nu\lambda}\rangle + \text{H.c.}$	586	I	1124	I	$\langle f_+^{\mu\nu} h^{\lambda\rho}\rangle\langle \bar{B}_6 \sigma_{\mu\lambda} D_\nu B_{6\rho}^*\rangle + \text{H.c.}$			2356	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5\gamma^\lambda D_\nu B_6 h^T_{\mu\lambda}\rangle + \text{H.c.}$			1125	I	$i\langle \nabla^\mu f_{+\mu}{}^\nu\rangle\langle \bar{B}_6 u^\lambda D_\nu B_{6\lambda}^*\rangle + \text{H.c.}$			2357	
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu \gamma_5\gamma^\lambda D_{\mu\nu}{}^\rho B_6 f^T_{-\lambda\rho}\rangle + \text{H.c.}$			1126	I	$i\langle \nabla^\mu f_{+\mu}{}^\nu\rangle\langle \bar{B}_6 u^\lambda D_\lambda B_{6\nu}^*\rangle + \text{H.c.}$			2358	
$\langle \bar{B}_{\bar{3}} u^\mu f_{-\mu}{}^\nu u^\lambda \gamma_5\gamma_\nu D_\lambda B_6\rangle + \text{H.c.}$	587	I	1127	I	$i\langle \bar{B}_6 \nabla^\mu \nabla_\mu f_+^{\nu\lambda} \gamma_5\gamma_\nu B_{6\lambda}^*\rangle + \text{H.c.}$	1177		2359	
$\langle \bar{B}_{\bar{3}} u^\mu f_{-\mu}{}^\nu u^\lambda \gamma_5\gamma_\lambda D_\nu B_6\rangle + \text{H.c.}$	588	I	1128	I	$i\langle \nabla^\mu \nabla_\mu f_+^{\nu\lambda}\rangle\langle \bar{B}_6 \gamma_5\gamma_\nu B_{6\lambda}^*\rangle + \text{H.c.}$			2360	
$\langle \bar{B}_{\bar{3}} u^\mu f_-^{\nu\lambda} u_\mu \gamma_5\gamma_\nu D_\lambda B_6\rangle + \text{H.c.}$	589	I	1129	I	$\langle \bar{B}_6 f_+^{\mu\nu} f_{+\mu}{}^\lambda \gamma_5\gamma_\nu B_{6\lambda}^*\rangle + \text{H.c.}$	1178		2361	
$\langle \bar{B}_{\bar{3}} u^\mu f_-^{\nu\lambda} u_\nu \gamma_5\gamma_\mu D_\lambda B_6\rangle + \text{H.c.}$			1130	I	$\langle \bar{B}_6 f_+^{\mu\nu} f_{+\mu}{}^\lambda \gamma_5\gamma_\lambda B_{6\nu}^*\rangle + \text{H.c.}$	1179		2362	
$\langle \bar{B}_{\bar{3}} u^\mu f_-^{\nu\lambda} u_\nu \gamma_5\gamma_\lambda D_\mu B_6\rangle + \text{H.c.}$			1131	I	$\langle \bar{B}_6 f_+^{\mu\nu} f_+^{\lambda\rho} \gamma_5\gamma_\mu D_{\nu\lambda} B_{6\rho}^*\rangle + \text{H.c.}$	1180		2363	
$\langle \bar{B}_{\bar{3}} u^\mu f_-^{\nu\lambda} u^\rho \gamma_5\gamma_\nu D_{\mu\lambda\rho} B_6\rangle + \text{H.c.}$	590	I	1132	I	$\langle \bar{B}_6 f_+^{\mu\nu} \gamma_5\gamma_\mu B_6^{*\lambda} f^T_{+\nu\lambda}\rangle + \text{H.c.}$	1181		2364	
$\langle \bar{B}_{\bar{3}} u^\mu f_{-\mu}{}^\nu \gamma_5\gamma_\nu D^\lambda B_6 u^T_\lambda\rangle + \text{H.c.}$	591	I	1133	I	$\langle \bar{B}_6 f_+^{\mu\nu} \gamma_5\gamma_\mu D_\nu{}^\lambda B_6^{*\rho} f^T_{+\lambda\rho}\rangle + \text{H.c.}$	1182		2365	
$\langle \bar{B}_{\bar{3}} u^\mu f_{-\mu}{}^\nu \gamma_5\gamma^\lambda D_\nu B_6 u^T_\lambda\rangle + \text{H.c.}$	592	I	1134	I	$\langle f_+^{\mu\nu}\rangle\langle \bar{B}_6 f_{+\mu}{}^\lambda \gamma_5\gamma_\nu B_{6\lambda}^*\rangle + \text{H.c.}$	1183		2366	
$\langle \bar{B}_{\bar{3}} u^\mu f_-^{\nu\lambda} \gamma_5\gamma_\mu D_\nu B_6 u^T_\lambda\rangle + \text{H.c.}$	593	I	1135	I	$\langle f_+^{\mu\nu}\rangle\langle \bar{B}_6 f_{+\mu}{}^\lambda \gamma_5\gamma_\lambda B_{6\nu}^*\rangle + \text{H.c.}$	1184		2367	
$\langle \bar{B}_{\bar{3}} u^\mu f_-^{\nu\lambda} \gamma_5\gamma_\nu D_\mu B_6 u^T_\lambda\rangle + \text{H.c.}$	594	I	1136	I	$\langle f_+^{\mu\nu}\rangle\langle \bar{B}_6 f_+^{\lambda\rho} \gamma_5\gamma_\mu D_{\nu\lambda} B_{6\rho}^*\rangle + \text{H.c.}$	1185		2368	
$\langle \bar{B}_{\bar{3}} u^\mu f_-^{\nu\lambda} \gamma_5\gamma_\nu D_\lambda B_6 u^T_\mu\rangle + \text{H.c.}$	595	I	1137	I	$\langle f_+^{\mu\nu}\rangle\langle \bar{B}_6 f_+^{\lambda\rho} \gamma_5\gamma_\lambda D_{\mu\rho} B_{6\nu}^*\rangle + \text{H.c.}$	1186		2369	
$\langle \bar{B}_{\bar{3}} u^\mu f_-^{\nu\lambda} \gamma_5\gamma_\nu D_{\mu\lambda}{}^\rho B_6 u^T_\rho\rangle + \text{H.c.}$	596	I	1138	I	$\langle f_+^{\mu\nu}\rangle\langle f_{+\mu}{}^\lambda\rangle\langle \bar{B}_6 \gamma_5\gamma_\nu B_{6\lambda}^*\rangle + \text{H.c.}$			2370	
$\langle \bar{B}_{\bar{3}} u^\mu h_\mu{}^\nu u^\lambda \gamma_5\gamma_\nu D_\lambda B_6\rangle + \text{H.c.}$	597	I	1139	I	$\langle f_+^{\mu\nu}\rangle\langle f_+^{\lambda\rho}\rangle\langle \bar{B}_6 \gamma_5\gamma_\mu D_{\nu\lambda} B_{6\rho}^*\rangle + \text{H.c.}$			2371	
$\langle \bar{B}_{\bar{3}} u^\mu h_\mu{}^\nu u^\lambda \gamma_5\gamma_\lambda D_\nu B_6\rangle + \text{H.c.}$			1140	I	$\langle f_+^{\mu\nu} f_{+\mu}{}^\lambda\rangle\langle \bar{B}_6 \gamma_5\gamma_\nu B_{6\lambda}^*\rangle + \text{H.c.}$			2372	
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} u_\mu \gamma_5\gamma_\nu D_\lambda B_6\rangle + \text{H.c.}$			1141	I	$\langle f_+^{\mu\nu} f_+^{\lambda\rho}\rangle\langle \bar{B}_6 \gamma_5\gamma_\mu D_{\nu\lambda} B_{6\rho}^*\rangle + \text{H.c.}$			2373	

(Table continued)

TABLE VIII. (*Continued*)

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} u_\nu \gamma_5\gamma_\mu D_\lambda B_6\rangle$ + H.c.			1142	I	$\langle \bar{B}_6 u^\mu u^\nu \chi_+\gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1187		2374	
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} u_\nu \gamma_5\gamma_\lambda D_\mu B_6\rangle$ + H.c.			1143	I	$\langle \bar{B}_6 u^\mu u^\nu \chi_+\gamma_5\gamma_\nu B^*_{6\mu}\rangle$ + H.c.	1188		2375	
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} u^\rho \gamma_5\gamma_\mu D_{\nu\lambda\rho} B_6\rangle$ + H.c.			1144	I	$\langle \bar{B}_6 u^\mu u^\nu \gamma_5\gamma_\mu B^*_{6\nu}\chi_+^T\rangle$ + H.c.	1189		2376	
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} u^\rho \gamma_5\gamma_\nu D_{\mu\lambda\rho} B_6\rangle$ + H.c.			1145	I	$\langle \bar{B}_6 u^\mu u^\nu \gamma_5\gamma_\nu B^*_{6\mu}\chi_+^T\rangle$ + H.c.			2377	
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} u^\rho \gamma_5\gamma_\rho D_{\mu\nu\lambda} B_6\rangle$ + H.c.			1146	I	$\langle \bar{B}_6 u^\mu \chi_+ u^\nu \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1190		2378	
$\langle \bar{B}_{\bar{3}} u^\mu h_\mu{}^\nu \gamma_5\gamma_\nu D^\lambda B_6 u^T{}_\lambda\rangle$ + H.c.	598	I	1147	I	$\langle \bar{B}_6 u^\mu \chi_+ u^\nu \gamma_5\gamma_\nu B^*_{6\mu}\rangle$ + H.c.	1191		2379	
$\langle \bar{B}_{\bar{3}} u^\mu h_\mu{}^\nu \gamma_5\gamma^\lambda D_\nu B_6 u^T{}_\lambda\rangle$ + H.c.	599	I	1148	I	$\langle \bar{B}_6 u^\mu \chi_+ \gamma_5\gamma_\mu B^{*\nu}_6 u^T{}_\nu\rangle$ + H.c.	1192		2380	
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} \gamma_5\gamma_\mu D_\nu B_6 u^T{}_\lambda\rangle$ + H.c.	600	I	1149	I	$\langle \bar{B}_6 u^\mu \chi_+ \gamma_5\gamma^\nu B^*_{6\mu} u^T{}_\nu\rangle$ + H.c.	1193		2381	
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} \gamma_5\gamma_\nu D_\mu B_6 u^T{}_\lambda\rangle$ + H.c.	601	I	1150	I	$\langle \bar{B}_6 u^\mu \gamma_5\gamma_\mu B^{*\nu}_6 u^T{}_\nu\chi_+^T\rangle$ + H.c.	1194		2382	
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} \gamma_5\gamma_\nu D_\lambda B_6 u^T{}_\mu\rangle$ + H.c.			1151	I	$\langle \bar{B}_6 u^\mu \gamma_5\gamma^\nu B^*_{6\mu} u^T{}_\nu\chi_+^T\rangle$ + H.c.	1195		2383	
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} \gamma_5\gamma_\mu D_{\nu\lambda}{}^\rho B_6 u^T{}_\rho\rangle$ + H.c.	602	I	1152	I	$\langle \bar{B}_6 \chi_+ u^\mu u^\nu \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.			2384	
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} \gamma_5\gamma_\nu D_{\mu\lambda}{}^\rho B_6 u^T{}_\rho\rangle$ + H.c.			1153	I	$\langle \bar{B}_6 \chi_+ u^\mu u^\nu \gamma_5\gamma_\nu B^*_{6\mu}\rangle$ + H.c.			2385	
$\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} \gamma_5\gamma^\rho D_{\mu\nu\lambda} B_6 u^T{}_\rho\rangle$ + H.c.	603	I	1154	I	$\langle \bar{B}_6 \gamma_5\gamma^\mu B^{*\nu}_6\rangle\langle u_\mu u_\nu\chi_+\rangle$ + H.c.	1196		2386	
$\langle \bar{B}_{\bar{3}} u^\mu \gamma_5\gamma_\mu D^\nu B_6 u^{T\lambda} f^T_{-\nu\lambda}\rangle$ + H.c.			1155	I	$\langle \bar{B}_6 \gamma_5\gamma^\mu B^{*\nu}_6\rangle\langle u_\nu u_\mu\chi_+\rangle$ + H.c.			2387	
$\langle \bar{B}_{\bar{3}} u^\mu \gamma_5\gamma^\nu D_\mu B_6 u^{T\lambda} f^T_{-\nu\lambda}\rangle$ + H.c.			1156	I	$\langle u^\mu u^\nu\rangle\langle \bar{B}_6 \chi_+\gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.			2388	
$\langle \bar{B}_{\bar{3}} u^\mu \gamma_5\gamma^\nu D^\lambda B_6 u^T{}_\mu f^T_{-\nu\lambda}\rangle$ + H.c.			1157	I	$\langle u^\mu \chi_+\rangle\langle \bar{B}_6 u^\nu \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.			2389	
$\langle \bar{B}_{\bar{3}} u^\mu \gamma_5\gamma^\nu D^\lambda B_6 u^T{}_\nu f^T_{-\mu\lambda}\rangle$ + H.c.			1158	I	$\langle u^\mu \chi_+\rangle\langle \bar{B}_6 u^\nu \gamma_5\gamma_\nu B^*_{6\mu}\rangle$ + H.c.			2390	
$\langle \bar{B}_{\bar{3}} u^\mu \gamma_5\gamma^\nu D^\lambda B_6 u^T{}_\lambda f^T_{-\mu\nu}\rangle$ + H.c.			1159	I	$\langle \chi_+\rangle\langle \bar{B}_6 u^\mu u^\nu \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.			2391	
$\langle \bar{B}_{\bar{3}} u^\mu \gamma_5\gamma^\nu D_\mu B_6 u^{T\lambda} h^T{}_{\nu\lambda}\rangle$ + H.c.			1160	I	$\langle \chi_+\rangle\langle \bar{B}_6 u^\mu u^\nu \gamma_5\gamma_\nu B^*_{6\mu}\rangle$ + H.c.			2392	
$\langle \bar{B}_{\bar{3}} u^\mu \gamma_5\gamma^\nu D^\lambda B_6 u^T{}_\lambda h^T{}_{\mu\nu}\rangle$ + H.c.			1161	I	$\langle \chi_+\rangle\langle \bar{B}_6 u^\mu \gamma_5\gamma_\mu B^{*\nu}_6 u^T{}_\nu\rangle$ + H.c.			2393	
$\langle \bar{B}_{\bar{3}} u^\mu \gamma_5\gamma^\nu D_\mu{}^{\lambda\rho} B_6 u^T{}_\lambda f^T_{-\nu\rho}\rangle$ + H.c.			1162	I	$\langle \bar{B}_6 u^\mu \nabla^\nu\chi_+ D_\nu B^*_{6\mu}\rangle$ + H.c.	1197		2394	
$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} u_\mu u^\lambda \gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			1163	I	$\langle \bar{B}_6 u^\mu \nabla^\nu\chi_+ D_\nu B^*_{6\mu}\rangle$ + H.c.	1198		2395	
$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} u_\mu u^\lambda \gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.			1164	I	$\langle \bar{B}_6 \chi_+ f_-{}^{\mu\nu} D_\mu B^*_{6\nu}\rangle$ + H.c.	1199		2396	
$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} u^\lambda u_\mu \gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			1165	I	$\langle \bar{B}_6 \chi_+ h^{\mu\nu} D_\mu B^*_{6\nu}\rangle$ + H.c.	1200		2397	
$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} u^\lambda u_\mu \gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.			1166	I	$\langle \bar{B}_6 D^\mu B^{*\nu}_6\rangle\langle u_\mu \nabla_\nu\chi_+\rangle$ + H.c.			2398	
$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} u^\lambda u_\lambda \gamma_5\gamma_\mu D_\nu B_6\rangle$ + H.c.			1167	I	$\langle \bar{B}_6 D^\mu B^{*\nu}_6\rangle\langle u_\nu \nabla_\mu\chi_+\rangle$ + H.c.			2399	
$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} u^\lambda u^\rho \gamma_5\gamma_\nu D_{\lambda\rho} B_6\rangle$ + H.c.			1168	I	$i\langle \bar{B}_6 f_+{}^{\mu\nu}\chi_+\gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1201		2400	
$\langle \bar{B}_{\bar{3}} h^{\mu\nu} u_\mu u^\lambda \gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			1169	I	$i\langle \bar{B}_6 f_+{}^{\mu\nu}\gamma_5\gamma_\mu B^*_{6\nu}\chi_+^T\rangle$ + H.c.	1202		2401	
$\langle \bar{B}_{\bar{3}} h^{\mu\nu} u^\lambda u_\mu \gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			1170	I	$i\langle \bar{B}_6 \chi_+ f_+{}^{\mu\nu}\gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1203		2402	
$\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^\nu B_6\rangle\langle u_\mu u^\lambda f_{-\nu\lambda}\rangle$ + H.c.			1171	I	$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_6 \chi_+\gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1204		2403	
$\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^\nu B_6\rangle\langle u_\nu u^\lambda f_{-\mu\lambda}\rangle$ + H.c.			1172	I	$i\langle f_+{}^{\mu\nu}\rangle\langle \chi_+\rangle\langle \bar{B}_6 \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1205		2404	
$\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^\nu B_6\rangle\langle u^\lambda u_\mu f_{-\nu\lambda}\rangle$ + H.c.			1173	I	$i\langle f_+{}^{\mu\nu}\chi_+\rangle\langle \bar{B}_6 \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1206		2405	
$\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^\nu B_6\rangle\langle u^\lambda u_\nu f_{-\mu\lambda}\rangle$ + H.c.			1174	I	$i\langle \chi_+\rangle\langle \bar{B}_6 f_+{}^{\mu\nu}\gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.			2406	
$\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^\nu B_6\rangle\langle u^\lambda u_\lambda f_{-\mu\nu}\rangle$ + H.c.			1175	I	$i\langle \bar{B}_6 u^\mu u^\nu \chi_- D_\mu B^*_{6\nu}\rangle$ + H.c.	1207		2407	
$\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^\nu B_6\rangle\langle u_\mu u^\lambda h_{\nu\lambda}\rangle$ + H.c.			1176	I	$i\langle \bar{B}_6 u^\mu u^\nu \chi_- D_\nu B^*_{6\mu}\rangle$ + H.c.	1208		2408	
$\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^\nu B_6\rangle\langle u_\nu u^\lambda h_{\mu\lambda}\rangle$ + H.c.			1177	I	$i\langle \bar{B}_6 u^\mu u^\nu D_\mu B^*_{6\nu}\chi_-^T\rangle$ + H.c.	1209		2409	
$\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^\nu B_6\rangle\langle u^\lambda u_\mu h_{\nu\lambda}\rangle$ + H.c.			1178	I	$i\langle \bar{B}_6 u^\mu u^\nu D_\nu B^*_{6\mu}\chi_-^T\rangle$ + H.c.			2410	
$\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^\nu B_6\rangle\langle u^\lambda u_\nu h_{\mu\lambda}\rangle$ + H.c.			1179	I	$i\langle \bar{B}_6 u^\mu \chi_- u^\nu D_\mu B^*_{6\nu}\rangle$ + H.c.	1210		2411	
$\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^{\nu\rho} B_6\rangle\langle u_\nu u_\lambda f_{-\mu\rho}\rangle$ + H.c.			1180	I	$i\langle \bar{B}_6 u^\mu \chi_- u^\nu D_\nu B^*_{6\mu}\rangle$ + H.c.	1211		2412	
$\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^{\nu\lambda\rho} B_6\rangle\langle u_\mu u_\nu h_{\lambda\rho}\rangle$ + H.c.			1181	I	$i\langle \bar{B}_6 u^\mu \chi_- D_\mu B^{*\nu}_6 u^T{}_\nu\rangle$ + H.c.	1212		2413	
$\langle \bar{B}_{\bar{3}} \gamma_5\gamma^\mu D^{\nu\lambda\rho} B_6\rangle\langle u_\nu u_\mu h_{\lambda\rho}\rangle$ + H.c.			1182	I	$i\langle \bar{B}_6 u^\mu \chi_- D_\nu B^*_{6\mu} u^T{}_\nu\rangle$ + H.c.	1213		2414	
$\langle u^\mu u_\mu\rangle\langle \bar{B}_{\bar{3}} f_-{}^{\nu\lambda} \gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			1183	I	$i\langle \bar{B}_6 u^\mu D_\mu B^{*\nu}_6 u^T{}_\nu\chi_-^T\rangle$ + H.c.	1214		2415	
$\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} f_{-\mu}{}^\lambda \gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			1184	I	$i\langle \bar{B}_6 u^\mu D^\nu B^*_{6\mu} u^T{}_\nu\chi_-^T\rangle$ + H.c.	1215		2416	
$\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} f_{-\mu}{}^\lambda \gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.			1185	I	$i\langle \bar{B}_6 \chi_- u^\mu u^\nu D_\mu B^*_{6\nu}\rangle$ + H.c.			2417	
$\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} f_-{}^{\lambda\rho} \gamma_5\gamma_\lambda D_{\mu\nu\rho} B_6\rangle$ + H.c.			1186	I	$i\langle \bar{B}_6 \chi_- u^\mu u^\nu D_\nu B^*_{6\mu}\rangle$ + H.c.			2418	
$\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} h_\mu{}^\lambda \gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.			1187	I	$i\langle \bar{B}_6 D^\mu B^{*\nu}_6\rangle\langle u_\mu u_\nu\chi_-\rangle$ + H.c.	1216		2419	
$\langle u^\mu f_{-\mu}{}^\nu\rangle\langle \bar{B}_{\bar{3}} u^\lambda \gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			1188	I	$i\langle \bar{B}_6 D^\mu B^{*\nu}_6\rangle\langle u_\nu u_\mu\chi_-\rangle$ + H.c.			2420	

(*Table continued*)

TABLE VIII. (Continued)

O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$	O_n	$SU(2)$	$\tilde{e}_n^{(4)}$	$SU(3)$	$\tilde{E}_n^{(4)}$
$\langle u^\mu f_{-\mu}{}^\nu\rangle\langle \bar{B}_{\bar 3} u^\lambda \gamma_5\gamma_\lambda D_\nu B_6\rangle$ + H.c.			1189	I	$i\langle u^\mu u^\nu\rangle\langle \bar{B}_6 \chi_- D_\mu B^*_{6\nu}\rangle$ + H.c.			2421	
$\langle u^\mu h_\mu{}^\nu\rangle\langle \bar{B}_{\bar 3} u^\lambda \gamma_5\gamma_\nu D_\lambda B_6\rangle$ + H.c.			1190	I	$i\langle u^\mu \chi_-\rangle\langle \bar{B}_6 u^\nu D_\mu B^*_{6\nu}\rangle$ + H.c.			2422	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu u_\nu f_{-\lambda\rho} B_6\rangle$ + H.c.	604		1191		$i\langle u^\mu \chi_-\rangle\langle \bar{B}_6 u^\nu D_\nu B^*_{6\mu}\rangle$ + H.c.			2423	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu u_\nu f_{-\lambda}{}^\sigma D_{\rho\sigma} B_6\rangle$ + H.c.	605		1192		$i\langle \chi_-\rangle\langle \bar{B}_6 u^\mu u^\nu D_\mu B^*_{6\nu}\rangle$ + H.c.			2424	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu u^\sigma f_{-\nu\lambda} D_{\rho\sigma} B_6\rangle$ + H.c.	606		1193		$i\langle \chi_-\rangle\langle \bar{B}_6 u^\mu u^\nu D_\nu B^*_{6\mu}\rangle$ + H.c.			2425	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu u_\nu h_\lambda{}^\sigma D_{\rho\sigma} B_6\rangle$ + H.c.	607		1194		$i\langle \chi_-\rangle\langle \bar{B}_6 u^\mu D_\mu B^{*\nu}_6 u^T_\nu\rangle$ + H.c.			2426	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu u_\nu B_6 f^T_{-\lambda\rho}\rangle$ + H.c.	608		1195		$i\langle \bar{B}_6 u^\mu \nabla^\nu \chi_- \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1217		2427	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu u_\nu D_\lambda{}^\sigma B_6 f^T_{-\rho\sigma}\rangle$ + H.c.	609		1196		$i\langle \bar{B}_6 u^\mu \nabla^\nu \chi_- \gamma_5\gamma_\nu B^*_{6\mu}\rangle$ + H.c.	1218		2428	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu u^\sigma D_{\nu\sigma} B_6 f^T_{-\lambda\rho}\rangle$ + H.c.			1197		$i\langle \bar{B}_6 u^\mu \gamma_5\gamma_\mu B^{*\nu}_6 \nabla_\nu \chi^T_-\rangle$ + H.c.	1219		2429	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu f_{-\nu\lambda} u_\rho B_6\rangle$ + H.c.			1198		$i\langle \bar{B}_6 u^\mu \gamma_5\gamma^\nu B^*_{6\mu} \nabla_\nu \chi^T_-\rangle$ + H.c.	1220		2430	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu f_{-\nu\lambda} u^\sigma D_{\rho\sigma} B_6\rangle$ + H.c.	610		1199		$i\langle \bar{B}_6 f_{-}{}^{\mu\nu} \chi_- \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1221		2431	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu f_{-\nu}{}^\sigma u_\lambda D_{\rho\sigma} B_6\rangle$ + H.c.			1200		$i\langle \bar{B}_6 f_{-}{}^{\mu\nu} \gamma_5\gamma_\mu B^*_{6\nu} \chi^T_-\rangle$ + H.c.	1222		2432	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu f_{-\nu\lambda} B_6 u^T_\rho\rangle$ + H.c.	611		1201		$i\langle \bar{B}_6 h^{\mu\nu} \chi_- \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1223		2433	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu f_{-\nu\lambda} D_\rho{}^\sigma B_6 u^T_\sigma\rangle$ + H.c.	612		1202		$i\langle \bar{B}_6 h^{\mu\nu} \gamma_5\gamma_\mu B^*_{6\nu} \chi^T_-\rangle$ + H.c.	1224		2434	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu f_{-\nu}{}^\sigma D_{\lambda\sigma} B_6 u^T_\rho\rangle$ + H.c.	613		1203		$i\langle \bar{B}_6 \chi_- f_{-}{}^{\mu\nu} \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1225		2435	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu h_\nu{}^\sigma u_\lambda D_{\rho\sigma} B_6\rangle$ + H.c.			1204		$i\langle \bar{B}_6 \chi_- h^{\mu\nu} \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1226		2436	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu h_\nu{}^\sigma D_{\lambda\sigma} B_6 u^T_\rho\rangle$ + H.c.			1205		$i\langle \bar{B}_6 \nabla^\mu \chi_- u^\nu \gamma_5\gamma_\mu B^*_6\rangle$ + H.c.	1227		2437	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu B_6 u^T_\nu f^T_{-\lambda\rho}\rangle$ + H.c.			1206		$i\langle \bar{B}_6 \nabla^\mu \chi_- u^\nu \gamma_5\gamma_\nu B^*_{6\mu}\rangle$ + H.c.	1228		2438	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu D_\nu{}^\sigma B_6 u^T_\lambda f^T_{-\rho\sigma}\rangle$ + H.c.			1207		$i\langle u^\mu \nabla^\nu \chi_-\rangle\langle \bar{B}_6 \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1229		2439	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} u_\mu D_\nu{}^\sigma B_6 u^T_\sigma f^T_{-\lambda\rho}\rangle$ + H.c.			1208		$i\langle u^\mu \nabla^\nu \chi_-\rangle\langle \bar{B}_6 \gamma_5\gamma_\nu B^*_{6\mu}\rangle$ + H.c.	1230		2440	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} f_{-\mu\nu} u_\lambda u_\rho B_6\rangle$ + H.c.			1209		$i\langle f_{-}{}^{\mu\nu} \chi_-\rangle\langle \bar{B}_6 \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1231		2441	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} f_{-\mu\nu} u_\lambda u^\sigma D_{\rho\sigma} B_6\rangle$ + H.c.			1210		$i\langle h^{\mu\nu} \chi_-\rangle\langle \bar{B}_6 \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.	1232		2442	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} f_{-\mu\nu} u^\sigma u_\lambda D_{\rho\sigma} B_6\rangle$ + H.c.			1211		$i\langle \chi_-\rangle\langle \bar{B}_6 f_{-}{}^{\mu\nu} \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.			2443	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} B_6\rangle\langle u_\mu u_\nu f_{-\lambda\rho}\rangle$ + H.c.			1212		$i\langle \chi_-\rangle\langle \bar{B}_6 h^{\mu\nu} \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.			2444	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} D_\mu{}^\sigma B_6\rangle\langle u_\nu u_\lambda f_{-\rho\sigma}\rangle$ + H.c.			1213		$i\langle \nabla^\mu \chi_-\rangle\langle \bar{B}_6 u^\nu \gamma_5\gamma_\mu B^*_{6\nu}\rangle$ + H.c.			2445	
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar 3} D_\mu{}^\sigma B_6\rangle\langle u_\nu u_\sigma f_{-\lambda\rho}\rangle$ + H.c.			1214		$i\langle \nabla^\mu \chi_-\rangle\langle \bar{B}_6 u^\nu \gamma_5\gamma_\nu B^*_{6\mu}\rangle$ + H.c.			2446	
$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu u^\sigma\rangle\langle \bar{B}_{\bar 3} f_{-\nu\lambda} D_{\rho\sigma} B_6\rangle$ + H.c.			1215		$\langle \bar{B}_6 f_{+}{}^{\mu\nu} \chi_- D_\mu B^*_{6\nu}\rangle$ + H.c.	1233		2447	
$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu f_{-\nu\lambda}\rangle\langle \bar{B}_{\bar 3} u_\rho B_6\rangle$ + H.c.			1216		$\langle \bar{B}_6 f_{+}{}^{\mu\nu} D_\mu B^*_{6\nu} \chi^T_-\rangle$ + H.c.	1234		2448	
$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu f_{-\nu\lambda}\rangle\langle \bar{B}_{\bar 3} u^\sigma D_{\rho\sigma} B_6\rangle$ + H.c.			1217		$\langle \bar{B}_6 D^\mu B^{*\nu}_6\rangle\langle f_{+\mu\nu} \chi_-\rangle$ + H.c.	1235		2449	
$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu h_\nu{}^\sigma\rangle\langle \bar{B}_{\bar 3} u_\lambda D_{\rho\sigma} B_6\rangle$ + H.c.			1218		$\langle f_{+}{}^{\mu\nu}\rangle\langle \bar{B}_6 \chi_- D_\mu B^*_{6\nu}\rangle$ + H.c.	1236		2450	
$\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu f_{-\mu\nu} B_6\rangle$ + H.c.	614		1219		$\langle f_{+}{}^{\mu\nu}\rangle\langle \chi_-\rangle\langle \bar{B}_6 D_\mu B^*_{6\nu}\rangle$ + H.c.	1237		2451	
$\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu f_{-\mu}{}^\lambda D_{\nu\lambda} B_6\rangle$ + H.c.	615		1220		$\langle \chi_-\rangle\langle \bar{B}_6 f_{+}{}^{\mu\nu} D_\mu B^*_{6\nu}\rangle$ + H.c.			2452	
$\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu f_{-\nu}{}^\lambda D_{\mu\lambda} B_6\rangle$ + H.c.	616		1221		$i\langle D^\mu D_\mu F_L{}^{\nu\lambda}\rangle\langle \bar{B}_6 \gamma_5\gamma_\nu B^*_{6\lambda}\rangle$ + P.C.H.	1238			
$i\langle \bar{B}_{\bar 3} u^\mu \nabla_\mu f_{-}{}^{\nu\lambda} \sigma_{\nu\lambda} B_6\rangle$ + H.c.	617	I	1222	I	$\langle F_L{}^{\mu\nu} F_{L\mu}{}^\lambda\rangle\langle \bar{B}_6 \gamma_5\gamma_\nu B^*_{6\lambda}\rangle$ + P.C.H.	1239		2453	
$i\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu f_{-\nu}{}^\lambda \sigma_{\mu\lambda} B_6\rangle$ + H.c.	618	I	1223	I	$\langle F_L{}^{\mu\nu} F_L{}^{\lambda\rho}\rangle\langle \bar{B}_6 \gamma_5\gamma_\mu D_{\nu\lambda} B^*_{6\rho}\rangle$ + P.C.H.	1240		2454	
$i\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu f_{-}{}^{\lambda\rho} \sigma_{\mu\lambda} D_{\nu\rho} B_6\rangle$ + H.c.	619	I	1224	I	$\langle F_L{}^{\mu\nu}\rangle\langle F_{L\mu}{}^\lambda\rangle\langle \bar{B}_6 \gamma_5\gamma_\nu B^*_{6\lambda}\rangle$ + P.C.H.	1241			
$i\langle \bar{B}_{\bar 3} u^\mu \nabla^\nu f_{-}{}^{\lambda\rho} \sigma_{\nu\lambda} D_{\mu\rho} B_6\rangle$ + H.c.	620	I	1225	I	$\langle F_L{}^{\mu\nu}\rangle\langle F_L{}^{\lambda\rho}\rangle\langle \bar{B}_6 \gamma_5\gamma_\mu D_{\nu\lambda} B^*_{6\rho}\rangle$ + P.C.H.	1242			

TABLE IX. Independent Lagrangian terms in the heavy-quark limit at the $\mathcal{O}(p^4)$ order.

P_n	$SU(2)$	$SU(3)$	P_n	$SU(2)$	$SU(3)$
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu u_\lambda u^\sigma v_\rho\psi_\sigma\rangle$	1	1	$\langle\bar{\psi}^\mu u_\mu\psi^\nu\rangle\langle u_\nu u^\lambda u_\lambda\rangle$ + H.c.		359
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu u_\lambda u^\sigma v_\sigma\psi_\rho\rangle$	2	2	$\langle\bar{\psi}^\mu u^\nu\psi_\mu\rangle\langle u_\nu u^\lambda u_\lambda\rangle$		360
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu u^\sigma u_\lambda v_\rho\psi_\sigma\rangle$		3	$\langle\bar{\psi}^\mu u^\nu\psi^\lambda\rangle\langle u_\mu u_\nu u_\lambda\rangle$		361
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu u^\sigma u_\lambda v_\sigma\psi_\rho\rangle$		4	$\langle\bar{\psi}^\mu u^\nu\psi^\lambda\rangle\langle u_\mu u_\lambda u_\nu\rangle$		362
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu u^\sigma u_\sigma v_\lambda\psi_\rho\rangle$	3	5	$\langle\bar{\psi}^\mu u_\mu v^\nu v^\lambda\psi^\rho\rangle\langle u_\nu u_\lambda u_\rho\rangle$ + H.c.		363
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma u_\nu u_\lambda v_\rho\psi_\sigma\rangle$		6	$\langle\bar{\psi}^\mu u^\nu v_\nu v^\lambda\psi_\mu\rangle\langle u_\lambda u^\rho u_\rho\rangle$		364
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma u_\nu u_\lambda v_\sigma\psi_\rho\rangle$		7	$\langle\bar{\psi}^\mu u^\nu v_\nu v^\lambda\psi^\rho\rangle\langle u_\mu u_\lambda u_\rho\rangle$		365
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma u_\nu u_\sigma v_\lambda\psi_\rho\rangle$		8	$\langle\bar{\psi}^\mu u^\nu v_\nu v^\lambda\psi^\rho\rangle\langle u_\mu u_\rho u_\lambda\rangle$		366
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma u_\sigma u_\nu v_\lambda\psi_\rho\rangle$		9	$\langle\bar{\psi}^\mu u^\nu v^\lambda v^\rho\psi_\mu\rangle\langle u_\nu u_\lambda u_\rho\rangle$		367
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu u^\sigma u^\delta v_\lambda v_\sigma v_\delta\psi_\rho\rangle$	4	10	$\langle\bar{\psi}^\mu u^\nu v_\nu v^\lambda v^\rho v^\sigma\psi_\mu\rangle\langle u_\lambda u_\rho u_\sigma\rangle$		368
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma u_\nu u^\delta v_\lambda v_\sigma v_\delta\psi_\rho\rangle$		11	$\langle\bar{\psi}^\mu\psi_\mu\rangle\langle u^\nu u_\nu\rangle\langle u^\lambda u_\lambda\rangle$		369
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma u^\delta u_\nu v_\lambda v_\sigma v_\delta\psi_\rho\rangle$		12	$\langle\bar{\psi}^\mu\psi_\mu\rangle\langle u^\nu u^\lambda\rangle\langle u_\nu u_\lambda\rangle$		370
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu u_\lambda v_\rho\psi^\sigma u^T_\sigma\rangle$		13	$\langle\bar{\psi}^\mu\psi^\nu\rangle\langle u_\mu u_\nu\rangle\langle u^\lambda u_\lambda\rangle$		371
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu u_\lambda v^\sigma\psi_\rho u^T_\sigma\rangle$		14	$\langle\bar{\psi}^\mu\psi^\nu\rangle\langle u_\mu u^\lambda\rangle\langle u_\nu u_\lambda\rangle$		372
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu u^\sigma v_\lambda\psi_\rho u^T_\sigma\rangle$	5	15	$\langle\bar{\psi}^\mu\psi_\mu\rangle\langle u^\nu u_\nu u^\lambda u_\lambda\rangle$		373
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu u^\sigma v_\lambda\psi_\sigma u^T_\rho\rangle$	6	16	$\langle\bar{\psi}^\mu\psi^\nu\rangle\langle u_\mu u_\nu u^\lambda u_\lambda\rangle$		374
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu u^\sigma v_\sigma\psi_\lambda u^T_\rho\rangle$	7	17	$\langle\bar{\psi}^\mu\psi^\nu\rangle\langle u_\mu u^\lambda u_\nu u_\lambda\rangle$		375
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma u_\nu v_\lambda\psi_\rho u^T_\sigma\rangle$		18	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi_\mu\rangle\langle u_\nu u_\lambda\rangle\langle u^\rho u_\rho\rangle$		376
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma u_\nu v_\lambda\psi_\sigma u^T_\rho\rangle$		19	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi_\mu\rangle\langle u_\nu u^\rho\rangle\langle u_\lambda u_\rho\rangle$		377
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma u_\nu v_\sigma\psi_\lambda u^T_\rho\rangle$		20	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi^\rho\rangle\langle u_\mu u_\nu\rangle\langle u_\lambda u_\rho\rangle$		378
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma u_\sigma v_\nu\psi_\lambda u^T_\rho\rangle$		21	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi^\rho\rangle\langle u_\mu u_\rho\rangle\langle u_\nu u_\lambda\rangle$		379
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu u^\sigma v_\lambda v_\sigma v^\delta\psi_\rho u^T_\delta\rangle$	8	22	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi_\mu\rangle\langle u_\nu u_\lambda u^\rho u_\rho\rangle$		380
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma u_\nu v_\lambda v_\sigma v^\delta\psi_\rho u^T_\delta\rangle$		23	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi^\rho\rangle\langle u_\mu u_\nu u_\lambda u_\rho\rangle$		381
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma u^\delta v_\nu v_\sigma v_\delta\psi_\lambda u^T_\rho\rangle$		24	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi^\rho\rangle\langle u_\mu u_\nu u_\rho u_\lambda\rangle$		382
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu v_\lambda\psi_\rho u^{T\sigma}u^T_\sigma\rangle$		25	$\langle\bar{\psi}^\mu v^\nu v^\lambda v^\rho v^\sigma\psi_\mu\rangle\langle u_\nu u_\lambda\rangle\langle u_\rho u_\sigma\rangle$		383
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu v_\lambda\psi^\sigma u^T_\rho u^T_\sigma\rangle$	9	26	$\langle u^\mu u_\mu\rangle\langle\bar{\psi}^\nu u_\nu\psi^\lambda u^T_\lambda\rangle$ + H.c.		384
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu v_\lambda\psi^\sigma u^T_\sigma u^T_\rho\rangle$		27	$\langle u^\mu u_\mu\rangle\langle\bar{\psi}^\nu u^\lambda\psi_\nu u^T_\lambda\rangle$		385
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu v^\sigma\psi_\lambda u^T_\rho u^T_\sigma\rangle$	10	28	$\langle u^\mu u_\mu\rangle\langle\bar{\psi}^\nu u^\lambda v_\lambda v^\rho\psi_\nu u^T_\rho\rangle$		386
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu v^\sigma\psi_\lambda u^T_\sigma u^T_\rho\rangle$		29	$\langle u^\mu u^\nu\rangle\langle\bar{\psi}_\mu u^\lambda v_\nu v_\lambda\psi^\rho u^T_\rho\rangle$ + H.c.		387
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma v_\nu\psi_\lambda u^T_\rho u^T_\sigma\rangle$		30	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu u_\lambda f_{-\rho}{}^\sigma\psi_\sigma\rangle$ + H.c.	193	388
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu v_\lambda v^\sigma v^\delta\psi_\rho u^T_\sigma u^T_\delta\rangle$		31	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu u^\sigma f_{-\lambda\rho}\psi_\sigma\rangle$ + H.c.	194	389
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma v_\nu v_\sigma v^\delta\psi_\lambda u^T_\rho u^T_\delta\rangle$		32	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu u^\sigma f_{-\lambda\sigma}\psi_\rho\rangle$ + H.c.	195	390
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu v_\nu\psi_\lambda\rangle\langle u_\rho u^\sigma u_\sigma\rangle$		33	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u^\sigma u_\nu f_{-\lambda\rho}\psi_\sigma\rangle$ + H.c.	196	391
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu v_\nu\psi^\sigma\rangle\langle u_\lambda u_\rho u_\sigma\rangle$		34	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u^\sigma u_\nu f_{-\lambda\sigma}\psi_\rho\rangle$ + H.c.		392
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu v^\sigma\psi_\nu\rangle\langle u_\lambda u_\rho u_\sigma\rangle$		35	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u^\sigma u_\sigma f_{-\nu\lambda}\psi_\rho\rangle$ + H.c.		393
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu v_\nu v^\sigma v^\delta\psi_\lambda\rangle\langle u_\rho u_\sigma u_\delta\rangle$		36	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu u_\lambda f_-^{\ \sigma\delta}v_\rho v_\sigma\psi_\delta\rangle$ + H.c.	197	394
$ie^{\mu\nu\lambda\rho}\langle u_\mu u^\sigma\rangle\langle\bar{B}_{\bar{3}}u_\nu v_\lambda\psi_\rho u^T_\sigma\rangle$		37	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu u^\sigma f_{-\lambda}{}^\delta v_\rho v_\sigma\psi_\delta\rangle$ + H.c.	198	395
$ie^{\mu\nu\lambda\rho}\langle u_\mu u^\sigma\rangle\langle\bar{B}_{\bar{3}}u_\nu v_\lambda\psi_\sigma u^T_\rho\rangle$		38	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu u^\sigma f_{-\lambda}{}^\delta v_\rho v_\delta\psi_\sigma\rangle$ + H.c.	199	396
$i\langle\bar{B}_{\bar{3}}u^\mu u_\mu f_-^{\ \nu\lambda}v_\nu\psi_\lambda\rangle$	11	39	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu u^\sigma f_{-\lambda}{}^\delta v_\sigma v_\delta\psi_\rho\rangle$ + H.c.		397
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_{-\mu}{}^\lambda v_\nu\psi_\lambda\rangle$	12	40	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu u^\sigma f_{-\sigma}{}^\delta v_\lambda v_\delta\psi_\rho\rangle$ + H.c.	200	398
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_{-\mu}{}^\lambda v_\lambda\psi_\nu\rangle$	13	41	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u^\sigma u_\nu f_{-\lambda}{}^\delta v_\rho v_\delta\psi_\sigma\rangle$ + H.c.	201	399
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_{-\nu}{}^\lambda v_\mu\psi_\lambda\rangle$	14	42	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u^\sigma u_\nu f_{-\sigma}{}^\delta v_\lambda v_\delta\psi_\rho\rangle$ + H.c.		400
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_{-\nu}{}^\lambda v_\lambda\psi_\mu\rangle$	15	43	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu u_\lambda h_\rho{}^\sigma\psi_\sigma\rangle$ + H.c.	202	401

(Table continued)

TABLE IX. *(Continued)*

P_n	$SU(2)$	$SU(3)$	P_n	$SU(2)$	$SU(3)$
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu f_-^{\lambda\rho}v_\mu v_\nu v_\lambda\psi_\rho\rangle$	16	44	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma h_{\lambda\sigma}\psi_\rho\rangle$ + H.c.	203	402
$i\langle\bar{B}_{\bar{3}}u^\mu u_\mu h^{\nu\lambda}v_\nu\psi_\lambda\rangle$		45	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u^\sigma u_\nu h_{\lambda\sigma}\psi_\rho\rangle$ + H.c.		403
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu h_\mu^{\ \lambda}v_\nu\psi_\lambda\rangle$	17	46	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u_\lambda h^{\sigma\delta}v_\rho v_\sigma\psi_\delta\rangle$ + H.c.	204	404
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu h_\mu^{\ \lambda}v_\lambda\psi_\nu\rangle$	18	47	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u_\lambda h^{\sigma\delta}v_\sigma v_\delta\psi_\rho\rangle$ + H.c.	205	405
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu h_\nu^{\ \lambda}v_\mu\psi_\lambda\rangle$	19	48	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma h_\lambda^{\ \delta}v_\rho v_\sigma\psi_\delta\rangle$ + H.c.	206	406
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu h_\nu^{\ \lambda}v_\lambda\psi_\mu\rangle$		49	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma h_\lambda^{\ \delta}v_\rho v_\delta\psi_\sigma\rangle$ + H.c.	207	407
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu h^{\lambda\rho}v_\mu v_\nu v_\lambda\psi_\rho\rangle$		50	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma h_\lambda^{\ \delta}v_\sigma v_\delta\psi_\rho\rangle$ + H.c.		408
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu h^{\lambda\rho}v_\mu v_\lambda v_\rho\psi_\nu\rangle$	20	51	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma h_\sigma^{\ \delta}v_\lambda v_\delta\psi_\rho\rangle$ + H.c.	208	409
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu h^{\lambda\rho}v_\nu v_\lambda v_\rho\psi_\mu\rangle$		52	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u^\sigma u_\nu h_\lambda^{\ \delta}v_\rho v_\delta\psi_\sigma\rangle$ + H.c.		410
$i\langle\bar{B}_{\bar{3}}u^\mu u_\mu v^\nu\psi^\lambda f^T_{-\nu\lambda}\rangle$		53	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u^\sigma u_\nu h_\sigma^{\ \delta}v_\lambda v_\delta\psi_\rho\rangle$ + H.c.		411
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu v_\mu\psi^\lambda f^T_{-\nu\lambda}\rangle$	21	54	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u^\sigma u_\sigma h_\nu^{\ \delta}v_\lambda v_\delta\psi_\rho\rangle$ + H.c.		412
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu v_\nu\psi^\lambda f^T_{-\mu\lambda}\rangle$		55	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma h^{\delta\alpha}v_\delta v_\sigma v_\delta v_\alpha\psi_\rho\rangle$ + H.c.		413
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu v^\lambda\psi_\mu f^T_{-\nu\lambda}\rangle$	22	56	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u_\lambda\psi^\sigma f^T_{-\rho\sigma}\rangle$ + H.c.	209	414
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu v^\lambda\psi_\nu f^T_{-\mu\lambda}\rangle$		57	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma\psi_\sigma f^T_{-\lambda\rho}\rangle$ + H.c.		415
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu v_\mu\psi^\lambda h^T_{\nu\lambda}\rangle$	23	58	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u_\lambda\psi^\sigma h^T_{\rho\sigma}\rangle$ + H.c.	210	416
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu v_\nu\psi^\lambda h^T_{\mu\lambda}\rangle$		59	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u_\lambda v_\rho v^\sigma\psi^\delta f^T_{-\sigma\delta}\rangle$ + H.c.	211	417
$i\langle\bar{B}_{\bar{3}}u^\mu u^\nu v_\mu v_\nu v^\lambda\psi^\rho f^T_{-\lambda\rho}\rangle$		60	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma v_\lambda v_\sigma\psi^\delta f^T_{-\rho\delta}\rangle$ + H.c.		418
$i\langle\bar{B}_{\bar{3}}u^\mu f_{-\mu}^{\ \nu}u^\lambda v_\nu\psi_\lambda\rangle$	24	61	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma v_\lambda v^\delta\psi_\sigma f^T_{-\rho\delta}\rangle$ + H.c.		419
$i\langle\bar{B}_{\bar{3}}u^\mu f_{-\mu}^{\ \nu}u^\lambda v_\lambda\psi_\nu\rangle$	25	62	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu u^\sigma v_\lambda v_\sigma\psi^\delta h^T_{\rho\delta}\rangle$ + H.c.		420
$i\langle\bar{B}_{\bar{3}}u^\mu f_-^{\ \nu\lambda}u_\mu v_\nu\psi_\lambda\rangle$	26	63	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_{-\lambda\rho}u^\sigma\psi_\sigma\rangle$ + H.c.	212	421
$i\langle\bar{B}_{\bar{3}}u^\mu f_-^{\ \nu\lambda}u_\nu v_\mu\psi_\lambda\rangle$		64	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_{-\lambda}^{\ \sigma}u_\rho\psi_\sigma\rangle$ + H.c.		422
$i\langle\bar{B}_{\bar{3}}u^\mu f_-^{\ \nu\lambda}u_\nu v_\lambda\psi_\mu\rangle$		65	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_{-\lambda}^{\ \sigma}u^\delta v_\rho v_\sigma\psi_\delta\rangle$ + H.c.	213	423
$i\langle\bar{B}_{\bar{3}}u^\mu f_-^{\ \nu\lambda}u^\rho v_\mu v_\nu v_\rho\psi_\lambda\rangle$	27	66	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_{-\lambda}^{\ \sigma}u^\delta v_\rho v_\delta\psi_\sigma\rangle$ + H.c.	214	424
$i\langle\bar{B}_{\bar{3}}u^\mu f_{-\mu}^{\ \nu}v_\nu\psi^\lambda u^T_\lambda\rangle$	28	67	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_-^{\ \sigma\delta}u_\lambda v_\rho v_\sigma\psi_\delta\rangle$ + H.c.		425
$i\langle\bar{B}_{\bar{3}}u^\mu f_{-\mu}^{\ \nu}v^\lambda\psi_\nu u^T_\lambda\rangle$	29	68	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_{-\lambda\rho}\psi^\sigma u^T_\sigma\rangle$ + H.c.	215	426
$i\langle\bar{B}_{\bar{3}}u^\mu f_-^{\ \nu\lambda}v_\mu\psi_\nu u^T_\lambda\rangle$	30	69	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_{-\lambda}^{\ \sigma}\psi_\rho u^T_\sigma\rangle$ + H.c.	216	427
$i\langle\bar{B}_{\bar{3}}u^\mu f_-^{\ \nu\lambda}v_\nu\psi_\mu u^T_\lambda\rangle$	31	70	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_{-\lambda}^{\ \sigma}\psi_\sigma u^T_\rho\rangle$ + H.c.	217	428
$i\langle\bar{B}_{\bar{3}}u^\mu f_-^{\ \nu\lambda}v_\nu\psi_\lambda u^T_\mu\rangle$	32	71	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u^\sigma f_{-\nu\lambda}\psi_\rho u^T_\sigma\rangle$ + H.c.		429
$i\langle\bar{B}_{\bar{3}}u^\mu f_-^{\ \nu\lambda}v_\mu v_\nu v^\rho\psi_\lambda u^T_\rho\rangle$	33	72	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u^\sigma f_{-\nu\lambda}\psi_\sigma u^T_\rho\rangle$ + H.c.		430
$i\langle\bar{B}_{\bar{3}}u^\mu h_\mu^{\ \nu}u^\lambda v_\nu\psi_\lambda\rangle$		73	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u^\sigma f_{-\nu\sigma}\psi_\lambda u^T_\rho\rangle$ + H.c.		431
$i\langle\bar{B}_{\bar{3}}u^\mu h_\mu^{\ \nu}u^\lambda v_\lambda\psi_\nu\rangle$	34	74	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_{-\lambda}^{\ \sigma}v_\rho v_\sigma\psi^\delta u^T_\delta\rangle$ + H.c.	218	432
$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u_\mu v_\nu\psi_\lambda\rangle$		75	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_{-\lambda}^{\ \sigma}v_\rho v^\delta\psi_\sigma u^T_\delta\rangle$ + H.c.	219	433
$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u_\nu v_\mu\psi_\lambda\rangle$		76	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_{-\lambda}^{\ \sigma}v_\sigma v^\delta\psi_\rho u^T_\delta\rangle$ + H.c.	220	434
$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u_\nu v_\lambda\psi_\mu\rangle$		77	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_-^{\ \sigma\delta}v_\sigma v_\rho\psi_\rho u^T_\delta\rangle$ + H.c.		435
$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u^\rho v_\mu v_\nu v_\lambda\psi_\rho\rangle$		78	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu f_-^{\ \sigma\delta}v_\lambda v_\sigma\psi_\delta u^T_\rho\rangle$ + H.c.		436
$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u^\rho v_\mu v_\nu v_\rho\psi_\lambda\rangle$		79	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u^\sigma f_{-\nu\lambda}v_\rho v^\delta\psi_\sigma u^T_\delta\rangle$ + H.c.		437
$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}u^\rho v_\nu v_\lambda v_\rho\psi_\mu\rangle$		80	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u^\sigma f_{-\nu\sigma}v_\lambda v^\delta\psi_\rho u^T_\delta\rangle$ + H.c.		438
$i\langle\bar{B}_{\bar{3}}u^\mu h_\mu^{\ \nu}v_\nu\psi^\lambda u^T_\lambda\rangle$	35	81	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu h_\lambda^{\ \sigma}u_\rho\psi_\sigma\rangle$ + H.c.		439
$i\langle\bar{B}_{\bar{3}}u^\mu h_\mu^{\ \nu}v^\lambda\psi_\nu u^T_\lambda\rangle$	36	82	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu h_\lambda^{\ \sigma}u^\delta v_\rho v_\delta\psi_\sigma\rangle$ + H.c.	221	440
$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}v_\mu\psi_\nu u^T_\lambda\rangle$	37	83	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu h_\lambda^{\ \sigma}\psi_\rho u^T_\sigma\rangle$ + H.c.	222	441
$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}v_\nu\psi_\mu u^T_\lambda\rangle$	38	84	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu h_\lambda^{\ \sigma}\psi_\sigma u^T_\rho\rangle$ + H.c.	223	442
$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}v_\nu\psi_\lambda u^T_\mu\rangle$		85	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u^\sigma h_{\nu\sigma}\psi_\lambda u^T_\rho\rangle$ + H.c.		443
$i\langle\bar{B}_{\bar{3}}u^\mu h^{\nu\lambda}v_\mu v_\nu v_\lambda\psi^\rho u^T_\rho\rangle$	39	86	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu u_\nu h_\lambda^{\ \sigma}v_\rho v_\sigma\psi^\delta u^T_\delta\rangle$ + H.c.		444

(Table continued)

TABLE IX. *(Continued)*

P_n	$SU(2)$	$SU(3)$	P_n	$SU(2)$	$SU(3)$
$i\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} v_\mu v_\nu v^\rho \psi_\lambda u^T_\rho\rangle$	40	87	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu u_\nu h_\lambda^{\sigma} v_\rho v^\delta \psi_\sigma u^T_\delta\rangle$ + H.c.	224	445
$i\langle \bar{B}_{\bar{3}} u^\mu h^{\nu\lambda} v_\nu v_\lambda v^\rho \psi_\mu u^T_\rho\rangle$		88	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu u_\nu h^{\sigma\delta} v_\lambda v_\sigma \psi_\rho u^T_\delta\rangle$ + H.c.	225	446
$i\langle \bar{B}_{\bar{3}} u^\mu v_\mu \psi^\nu u^{T\lambda} f^T_{-\nu\lambda}\rangle$		89	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu u_\nu h^{\sigma\delta} v_\lambda v_\sigma \psi_\delta u^T_\rho\rangle$ + H.c.	226	447
$i\langle \bar{B}_{\bar{3}} u^\mu v^\nu \psi_\mu u^{T\lambda} f^T_{-\nu\lambda}\rangle$		90	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu u_\nu h^{\sigma\delta} v_\sigma v_\delta \psi_\lambda u^T_\rho\rangle$ + H.c.		448
$i\langle \bar{B}_{\bar{3}} u^\mu v^\nu \psi^\lambda u^T_\mu f^T_{-\nu\lambda}\rangle$		91	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu u^\sigma h_{\nu\sigma} v_\lambda v^\delta \psi_\rho u^T_\delta\rangle$ + H.c.		449
$i\langle \bar{B}_{\bar{3}} u^\mu v^\nu \psi^\lambda u^T_\nu f^T_{-\mu\lambda}\rangle$		92	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu u_\nu h^{\sigma\delta} v_\lambda v_\sigma v_\delta v^\alpha \psi_\rho u^T_\alpha\rangle$ + H.c.	227	450
$i\langle \bar{B}_{\bar{3}} u^\mu v^\nu \psi^\lambda u^T_\lambda f^T_{-\mu\nu}\rangle$		93	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu \psi_\nu\rangle\langle u_\lambda u^\sigma f_{-\rho\sigma}\rangle$ + H.c.		451
$i\langle \bar{B}_{\bar{3}} u^\mu v_\mu \psi^\nu u^{T\lambda} h^T_{\nu\lambda}\rangle$		94	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu \psi^\sigma\rangle\langle u_\nu u_\sigma f_{-\lambda\rho}\rangle$ + H.c.		452
$i\langle \bar{B}_{\bar{3}} u^\mu v^\nu \psi^\lambda u^T_\nu h^T_{\mu\lambda}\rangle$		95	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu \psi_\nu\rangle\langle u_\lambda u^\sigma h_{\rho\sigma}\rangle$ + H.c.		453
$i\langle \bar{B}_{\bar{3}} u^\mu v^\nu v^\lambda \psi^\rho u^T_\nu f^T_{-\lambda\rho}\rangle$		96	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu v_\nu v^\sigma \psi_\lambda\rangle\langle u_\rho u^\delta f_{-\sigma\delta}\rangle$ + H.c.		454
$i\langle \bar{B}_{\bar{3}} f_-^{\mu\nu} u_\mu u^\lambda v_\nu \psi_\lambda\rangle$		97	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu v_\nu v^\sigma \psi^\delta\rangle\langle u_\lambda u_\sigma f_{-\rho\delta}\rangle$ + H.c.		455
$i\langle \bar{B}_{\bar{3}} f_-^{\mu\nu} u_\mu u^\lambda v_\lambda \psi_\nu\rangle$		98	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu v_\nu v^\sigma \psi^\delta\rangle\langle u_\lambda u_\delta f_{-\rho\sigma}\rangle$ + H.c.		456
$i\langle \bar{B}_{\bar{3}} f_-^{\mu\nu} u^\lambda u_\mu v_\nu \psi_\lambda\rangle$		99	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu v_\nu v^\sigma \psi_\lambda\rangle\langle u_\rho u^\delta h_{\sigma\delta}\rangle$ + H.c.		457
$i\langle \bar{B}_{\bar{3}} f_-^{\mu\nu} u^\lambda u_\mu v_\lambda \psi_\nu\rangle$		100	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu v_\nu v^\sigma \psi^\delta\rangle\langle u_\lambda u_\rho h_{\sigma\delta}\rangle$ + H.c.		458
$i\langle \bar{B}_{\bar{3}} f_-^{\mu\nu} u^\lambda u_\lambda v_\mu \psi_\nu\rangle$		101	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu v_\nu v^\sigma \psi^\delta\rangle\langle u_\lambda u_\sigma h_{\rho\delta}\rangle$ + H.c.		459
$i\langle \bar{B}_{\bar{3}} f_-^{\mu\nu} u^\lambda u^\rho v_\mu v_\lambda v_\rho \psi_\nu\rangle$		102	$\epsilon^{\mu\nu\lambda\rho}\langle \bar{\psi}_\mu v_\nu v^\sigma \psi^\delta\rangle\langle u_\lambda u_\delta h_{\rho\sigma}\rangle$ + H.c.		460
$i\langle \bar{B}_{\bar{3}} h^{\mu\nu} u_\mu u^\lambda v_\lambda \psi_\nu\rangle$		103	$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu u^\sigma\rangle\langle \bar{\psi}_\nu f_{-\lambda\rho}\psi_\sigma\rangle$ + H.c.		461
$i\langle \bar{B}_{\bar{3}} h^{\mu\nu} u^\lambda u_\mu v_\lambda \psi_\nu\rangle$		104	$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu u^\sigma\rangle\langle \bar{\psi}_\nu f_{-\lambda}^{\delta} v_\rho v_\sigma \psi_\delta\rangle$ + H.c.		462
$i\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu\rangle\langle u_\mu u^\lambda f_{-\nu\lambda}\rangle$		105	$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu u^\sigma\rangle\langle \bar{\psi}_\nu f_{-\lambda}^{\delta} v_\rho v_\delta \psi_\sigma\rangle$ + H.c.		463
$i\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu\rangle\langle u_\nu u^\lambda f_{-\mu\lambda}\rangle$		106	$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu u^\sigma\rangle\langle \bar{\psi}_\nu h_\lambda^{\delta} v_\rho v_\sigma \psi_\delta\rangle$ + H.c.		464
$i\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu\rangle\langle u^\lambda u_\mu f_{-\nu\lambda}\rangle$		107	$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu f_{-\nu\lambda}\rangle\langle \bar{\psi}_\rho u^\sigma \psi_\sigma\rangle$ + H.c.		465
$i\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu\rangle\langle u^\lambda u_\nu f_{-\mu\lambda}\rangle$		108	$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu f_{-\nu\lambda}\rangle\langle \bar{\psi}^\sigma u_\rho \psi_\sigma\rangle$		466
$i\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu\rangle\langle u^\lambda u_\lambda f_{-\mu\nu}\rangle$		109	$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu f_{-\nu\lambda}\rangle\langle \bar{\psi}^\sigma u^\delta v_\rho v_\delta \psi_\sigma\rangle$		467
$i\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu\rangle\langle u_\mu u^\lambda h_{\nu\lambda}\rangle$		110	$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu f_{-\nu}^{\sigma}\rangle\langle \bar{\psi}_\lambda u^\delta v_\rho v_\sigma \psi_\delta\rangle$ + H.c.		468
$i\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu\rangle\langle u_\nu u^\lambda h_{\mu\lambda}\rangle$		111	$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu h_\nu^{\sigma}\rangle\langle \bar{\psi}_\lambda u_\rho \psi_\sigma\rangle$		469
$i\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu\rangle\langle u^\lambda u_\mu h_{\nu\lambda}\rangle$		112	$\epsilon^{\mu\nu\lambda\rho}\langle u_\mu h_\nu^{\sigma}\rangle\langle \bar{\psi}_\lambda u^\delta v_\rho v_\sigma \psi_\delta\rangle$ + H.c.		470
$i\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu\rangle\langle u^\lambda u_\nu h_{\mu\lambda}\rangle$		113	$\langle \bar{\psi}^\mu u_\mu \nabla^\nu f_{-\nu}^{\lambda} \psi_\lambda\rangle$ + H.c.	228	471
$i\langle \bar{B}_{\bar{3}} v^\mu v^\nu v^\lambda \psi^\rho\rangle\langle u_\mu u_\nu f_{-\lambda\rho}\rangle$		114	$\langle \bar{\psi}^\mu u^\nu \nabla_\mu f_{-\nu}^{\lambda} \psi_\lambda\rangle$ + H.c.	229	472
$i\langle \bar{B}_{\bar{3}} v^\mu v^\nu v^\lambda \psi^\rho\rangle\langle u_\mu u_\nu h_{\lambda\rho}\rangle$		115	$\langle \bar{\psi}^\mu u^\nu \nabla_\nu f_{-\mu}^{\lambda} \psi_\lambda\rangle$ + H.c.	230	473
$i\langle \bar{B}_{\bar{3}} v^\mu v^\nu v^\lambda \psi^\rho\rangle\langle u_\mu u_\rho h_{\nu\lambda}\rangle$		116	$\langle \bar{\psi}^\mu u^\nu \nabla^\lambda f_{-\mu\lambda} \psi_\nu\rangle$ + H.c.	231	474
$i\langle u^\mu u_\mu\rangle\langle \bar{B}_{\bar{3}} f_-^{\nu\lambda} v_\nu \psi_\lambda\rangle$		117	$\langle \bar{\psi}^\mu u^\nu \nabla^\lambda f_{-\nu\lambda} \psi_\mu\rangle$ + H.c.	232	475
$i\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} f_{-\mu}^{\lambda} v_\nu \psi_\lambda\rangle$		118	$\langle \bar{\psi}^\mu u_\mu \nabla^\nu f_-^{\lambda\rho} v_\nu v_\lambda \psi_\rho\rangle$ + H.c.	233	476
$i\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} f_{-\mu}^{\lambda} v_\lambda \psi_\nu\rangle$		119	$\langle \bar{\psi}^\mu u^\nu \nabla_\mu f_-^{\lambda\rho} v_\nu v_\lambda \psi_\rho\rangle$ + H.c.	234	477
$i\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} f_-^{\lambda\rho} v_\mu v_\nu v_\lambda \psi_\rho\rangle$		120	$\langle \bar{\psi}^\mu u^\nu \nabla^\lambda f_{-\mu}^{\rho} v_\nu v_\lambda \psi_\rho\rangle$ + H.c.	235	478
$i\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}} h_\mu^{\lambda} v_\nu \psi_\lambda\rangle$		121	$\langle \bar{\psi}^\mu u^\nu \nabla^\lambda f_{-\mu}^{\rho} v_\lambda v_\rho \psi_\nu\rangle$ + H.c.	236	479
$i\langle u^\mu f_{-\mu}^{\nu}\rangle\langle \bar{B}_{\bar{3}} u^\lambda v_\nu \psi_\lambda\rangle$		122	$\langle \bar{\psi}^\mu u^\nu \nabla^\lambda f_{-\nu}^{\rho} v_\lambda v_\rho \psi_\mu\rangle$ + H.c.	237	480
$i\langle u^\mu f_{-\mu}^{\nu}\rangle\langle \bar{B}_{\bar{3}} u^\lambda v_\lambda \psi_\nu\rangle$		123	$\langle \bar{\psi}^\mu u^\nu \nabla^\lambda f_{-\lambda}^{\rho} v_\nu v_\rho \psi_\mu\rangle$ + H.c.	238	481
$i\langle u^\mu h_\mu^{\nu}\rangle\langle \bar{B}_{\bar{3}} u^\lambda v_\lambda \psi_\nu\rangle$		124	$\langle \bar{\psi}^\mu u^\nu \nabla_\mu h_\nu^{\lambda} \psi_\lambda\rangle$ + H.c.	239	482
$ie^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} u_\mu \nabla_\nu f_{-\lambda}^{\sigma} v_\rho \psi_\sigma\rangle$	41	125	$\langle \bar{\psi}^\mu u_\mu \nabla^\nu h^{\lambda\rho} v_\nu v_\lambda \psi_\rho\rangle$ + H.c.	240	483
$ie^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} u_\mu \nabla_\nu f_{-\lambda}^{\sigma} v_\sigma \psi_\rho\rangle$	42	126	$\langle \bar{\psi}^\mu u^\nu \nabla_\mu h^{\lambda\rho} v_\nu v_\lambda \psi_\rho\rangle$ + H.c.	241	484
$ie^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} u_\mu \nabla^\sigma f_{-\nu\sigma} v_\lambda \psi_\rho\rangle$	43	127	$\langle \bar{\psi}^\mu u^\nu \nabla_\mu h^{\lambda\rho} v_\lambda v_\rho \psi_\nu\rangle$ + H.c.	242	485
$ie^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} u_\mu \nabla^\sigma f_{-\nu}^{\delta} v_\lambda v_\sigma v_\delta \psi_\rho\rangle$	44	128	$\langle \bar{\psi}^\mu u^\nu \nabla_\nu h^{\lambda\rho} v_\lambda v_\rho \psi_\mu\rangle$ + H.c.	243	486
$ie^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} u_\mu \nabla_\nu h^{\sigma\delta} v_\lambda v_\sigma v_\delta \psi_\rho\rangle$	45	129	$\langle \bar{\psi}^\mu u^\nu \nabla^\lambda h^{\rho\sigma} v_\nu v_\lambda v_\rho v_\sigma \psi_\mu\rangle$ + H.c.	244	487

(Table continued)

TABLE IX. *(Continued)*

P_n	$SU(2)$	$SU(3)$	P_n	$SU(2)$	$SU(3)$
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu v_\nu\psi_\lambda\nabla^\sigma f^T_{-\rho\sigma}\rangle$	46	130	$\langle\bar{\psi}^\mu u_\mu\psi^\nu\nabla^\lambda f^T_{-\nu\lambda}\rangle$ + H.c.	245	488
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu v_\nu\psi^\sigma\nabla_\lambda f^T_{-\rho\sigma}\rangle$	47	131	$\langle\bar{\psi}^\mu u^\nu\psi_\mu\nabla^\lambda f^T_{-\nu\lambda}\rangle$	246	489
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{-\mu\nu}f_{-\lambda}{}^\sigma v_\rho\psi_\sigma\rangle$	48	132	$\langle\bar{\psi}^\mu u^\nu\psi^\lambda\nabla_\mu f^T_{-\nu\lambda}\rangle$ + H.c.	247	490
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{-\mu\nu}f_{-\lambda}{}^\sigma v_\sigma\psi_\rho\rangle$	49	133	$\langle\bar{\psi}^\mu u^\nu\psi^\lambda\nabla_\mu h^T_{\nu\lambda}\rangle$ + H.c.	248	491
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{-\mu\nu}h_\lambda{}^\sigma v_\rho\psi_\sigma\rangle$	50	134	$\langle\bar{\psi}^\mu u^\nu v_\nu v^\lambda\psi_\mu\nabla^\rho f^T_{-\lambda\rho}\rangle$	249	492
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{-\mu\nu}h_\lambda{}^\sigma v_\sigma\psi_\rho\rangle$	51	135	$\langle\bar{\psi}^\mu u^\nu v_\nu v^\lambda\psi^\rho\nabla_\mu f^T_{-\lambda\rho}\rangle$ + H.c.	250	493
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{-\mu\nu}h^{\sigma\delta}v_\lambda v_\sigma v_\delta\psi_\rho\rangle$	52	136	$\langle\bar{\psi}^\mu f_{-\mu}{}^\nu f_{-\nu}{}^\lambda\psi_\lambda\rangle$	251	494
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{-\mu\nu}v_\lambda\psi^\sigma f^T_{-\rho\sigma}\rangle$	53	137	$\langle\bar{\psi}^\mu f_{-}{}^{\nu\lambda}f_{-\mu\nu}\psi_\lambda\rangle$	252	495
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{-\mu\nu}v^\sigma\psi_\lambda f^T_{-\rho\sigma}\rangle$	54	138	$\langle\bar{\psi}^\mu f_{-}{}^{\nu\lambda}f_{-\nu\lambda}\psi_\mu\rangle$		496
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{-\mu\nu}v_\lambda\psi^\sigma h^T_{\rho\sigma}\rangle$	55	139	$\langle\bar{\psi}^\mu f_{-\mu}{}^\nu f_{-}{}^{\lambda\rho}v_\nu v_\lambda\psi_\rho\rangle$	253	497
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}\nabla_\mu f_{-\nu}{}^\sigma u_\lambda v_\rho\psi_\sigma\rangle$	56	140	$\langle\bar{\psi}^\mu f_{-}{}^{\nu\lambda}f_{-\mu}{}^\rho v_\nu v_\rho\psi_\lambda\rangle$	254	498
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}\nabla_\mu f_{-\nu}{}^\sigma u_\sigma v_\lambda\psi_\rho\rangle$	57	141	$\langle\bar{\psi}^\mu f_{-}{}^{\nu\lambda}f_{-\nu}{}^\rho v_\lambda v_\rho\psi_\mu\rangle$		499
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}h_\mu{}^\sigma f_{-\nu\lambda}v_\rho\psi_\sigma\rangle$	58	142	$\langle\bar{\psi}^\mu f_{-\mu}{}^\nu h_\nu{}^\lambda\psi_\lambda\rangle$ + H.c.	255	500
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}h_\mu{}^\sigma h_{\nu\sigma}v_\lambda\psi_\rho\rangle$	59	143	$\langle\bar{\psi}^\mu f_{-}{}^{\nu\lambda}h_{\mu\nu}\psi_\lambda\rangle$ + H.c.	256	501
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}h_\mu{}^\sigma v_\nu\psi_\lambda h^T_{\rho\sigma}\rangle$	60	144	$\langle\bar{\psi}^\mu f_{-\mu}{}^\nu\psi^\lambda f^T_{-\nu\lambda}\rangle$ + H.c.	257	502
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}v_\mu\psi_\nu\rangle\langle u_\lambda\nabla^\sigma f_{-\rho\sigma}\rangle$		145	$\langle\bar{\psi}^\mu f_{-}{}^{\nu\lambda}\psi_\mu f^T_{-\nu\lambda}\rangle$	258	503
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}v_\mu\psi_\nu\rangle\langle u^\sigma\nabla_\lambda f_{-\rho\sigma}\rangle$		146	$\langle\bar{\psi}^\mu f_{-\mu}{}^\nu\psi^\lambda h^T_{\nu\lambda}\rangle$ + H.c.	259	504
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}v_\mu\psi^\sigma\rangle\langle u_\nu\nabla_\lambda f_{-\rho\sigma}\rangle$		147	$\langle\bar{\psi}^\mu f_{-\mu}{}^\nu v_\nu v^\lambda\psi^\rho f^T_{-\lambda\rho}\rangle$ + H.c.	260	505
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}v_\mu\psi_\nu\rangle\langle f_{-\lambda}{}^\sigma h_{\rho\sigma}\rangle$		148	$\langle\bar{\psi}^\mu f_{-}{}^{\nu\lambda}v_\nu v^\rho\psi_\mu f^T_{-\lambda\rho}\rangle$	261	506
$ie^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}v_\mu v^\sigma v^\delta\psi_\nu\rangle\langle u_\lambda\nabla_\sigma f_{-\rho\delta}\rangle$		149	$\langle\bar{\psi}^\mu h_\mu{}^\nu h_\nu{}^\lambda\psi_\lambda\rangle$	262	507
$i\langle\bar{B}_{\bar{3}}\nabla^\mu\nabla_\mu f_{-}{}^{\nu\lambda}v_\nu\psi_\lambda\rangle$	61	150	$\langle\bar{\psi}^\mu h^{\nu\lambda}h_{\mu\nu}\psi_\lambda\rangle$	263	508
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u_\lambda u^\sigma v_\rho\psi_\sigma\rangle$	62	151	$\langle\bar{\psi}^\mu h^{\nu\lambda}h_{\nu\lambda}\psi_\mu\rangle$	264	509
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u_\lambda u^\sigma v_\sigma\psi_\rho\rangle$	63	152	$\langle\bar{\psi}^\mu h_\mu{}^\nu\psi^\lambda h^T_{\nu\lambda}\rangle$ + H.c.	265	510
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u^\sigma u_\lambda v_\rho\psi_\sigma\rangle$	64	153	$\langle\bar{\psi}^\mu h^{\nu\lambda}\psi_\mu h^T_{\nu\lambda}\rangle$	266	511
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u^\sigma u_\lambda v_\sigma\psi_\rho\rangle$	65	154	$\langle\bar{\psi}^\mu\psi_\mu\rangle\langle u^\nu\nabla^\lambda f_{-\nu\lambda}\rangle$		512
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u^\sigma u_\sigma v_\lambda\psi_\rho\rangle$	66	155	$\langle\bar{\psi}^\mu\psi^\nu\rangle\langle u_\mu\nabla^\lambda f_{-\nu\lambda}\rangle$ + H.c.		513
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u^\sigma u^\delta v_\lambda v_\sigma v_\delta\psi_\rho\rangle$	67	156	$\langle\bar{\psi}^\mu\psi^\nu\rangle\langle u^\lambda\nabla_\mu f_{-\nu\lambda}\rangle$ + H.c.		514
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u_\lambda v_\rho\psi^\sigma u^T_\sigma\rangle$	68	157	$\langle\bar{\psi}^\mu\psi^\nu\rangle\langle u^\lambda\nabla_\mu h_{\nu\lambda}\rangle$ + H.c.		515
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u_\lambda v^\sigma\psi_\rho u^T_\sigma\rangle$	69	158	$\langle\bar{\psi}^\mu\psi^\nu\rangle\langle f_{-\mu}{}^\lambda f_{-\nu\lambda}\rangle$		516
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u^\sigma v_\lambda\psi_\rho u^T_\sigma\rangle$	70	159	$\langle\bar{\psi}^\mu\psi^\nu\rangle\langle f_{-\mu}{}^\lambda h_{\nu\lambda}\rangle$ + H.c.		517
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u^\sigma v_\lambda\psi_\sigma u^T_\rho\rangle$	71	160	$\langle\bar{\psi}^\mu\psi_\mu\rangle\langle h^{\nu\lambda}h_{\nu\lambda}\rangle$		518
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u^\sigma v_\sigma\psi_\lambda u^T_\rho\rangle$	72	161	$\langle\bar{\psi}^\mu\psi^\nu\rangle\langle h_\mu{}^\lambda h_{\nu\lambda}\rangle$		519
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}u^\sigma v_\lambda v_\sigma v^\delta\psi_\rho u^T_\delta\rangle$	73	162	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi_\mu\rangle\langle u_\nu\nabla^\rho f_{-\lambda\rho}\rangle$		520
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}v_\lambda\psi_\rho u^{T\sigma}u^T_\sigma\rangle$		163	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi_\mu\rangle\langle u^\rho\nabla_\nu f_{-\lambda\rho}\rangle$		521
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}v_\lambda\psi^\sigma u^T_\rho u^T_\sigma\rangle$	74	164	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi^\rho\rangle\langle u_\mu\nabla_\nu f_{-\lambda\rho}\rangle$ + H.c.		522
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}v_\lambda\psi^\sigma u^T_\sigma u^T_\rho\rangle$		165	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi^\rho\rangle\langle u_\nu\nabla_\mu f_{-\lambda\rho}\rangle$ + H.c.		523
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}v^\sigma\psi_\lambda u^T_\rho u^T_\sigma\rangle$	75	166	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi_\mu\rangle\langle u^\rho\nabla_\nu h_{\lambda\rho}\rangle$		524
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}v^\sigma\psi_\lambda u^T_\sigma u^T_\rho\rangle$		167	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi^\rho\rangle\langle u_\mu\nabla_\nu h_{\lambda\rho}\rangle$ + H.c.		525
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}f_{+\mu\nu}v_\lambda v^\sigma v^\delta\psi_\rho u^T_\sigma u^T_\delta\rangle$		168	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi^\rho\rangle\langle u_\nu\nabla_\mu h_{\lambda\rho}\rangle$ + H.c.		526
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu f_{+\nu\lambda}u^\sigma v_\rho\psi_\sigma\rangle$	76	169	$\langle\bar{\psi}^\mu v^\nu v^\lambda\psi^\rho\rangle\langle f_{-\mu\nu}f_{-\lambda\rho}\rangle$		527
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu f_{+\nu\lambda}u^\sigma v_\sigma\psi_\rho\rangle$	77	170	$\langle\bar{\psi}^\mu v^\nu v^\lambda v^\rho v^\sigma\psi_\mu\rangle\langle u_\nu\nabla_\lambda h_{\rho\sigma}\rangle$		528
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu f_{+\nu}{}^\sigma u_\lambda v_\rho\psi_\sigma\rangle$	78	171	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu u_\nu u^\lambda\psi_\lambda\rangle$ + H.c.	267	529
$e^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu f_{+\nu}{}^\sigma u_\lambda v_\sigma\psi_\rho\rangle$	79	172	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu u^\lambda u_\nu\psi_\lambda\rangle$ + H.c.	268	530

(Table continued)

TABLE IX. *(Continued)*

P_n	$SU(2)$	$SU(3)$	P_n	$SU(2)$	$SU(3)$
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu f_{+\nu}{}^\sigma u_\sigma v_\lambda\psi_\rho\rangle$	80	173	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu u^\lambda u_\lambda\psi_\nu\rangle$ + H.c.	269	531
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu f_{+\nu}{}^\sigma u^\delta v_\lambda v_\sigma v_\delta\psi_\rho\rangle$	81	174	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u_\mu u_\nu\psi_\lambda\rangle$ + H.c.	270	532
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu f_{+\nu\lambda}v_\rho\psi^\sigma u^T{}_\sigma\rangle$	82	175	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u_\nu u_\mu\psi_\lambda\rangle$ + H.c.		533
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu f_{+\nu\lambda}v^\sigma\psi_\rho u^T{}_\sigma\rangle$	83	176	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u_\nu u_\lambda\psi_\mu\rangle$ + H.c.	271	534
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu f_{+\nu}{}^\sigma v_\lambda\psi_\rho u^T{}_\sigma\rangle$		177	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu u^\lambda u^\rho v_\nu v_\lambda\psi_\rho\rangle$ + H.c.	272	535
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu f_{+\nu}{}^\sigma v_\lambda\psi_\sigma u^T{}_\rho\rangle$		178	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu u^\lambda u^\rho v_\nu v_\rho\psi_\lambda\rangle$ + H.c.	273	536
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu f_{+\nu}{}^\sigma v_\sigma\psi_\lambda u^T{}_\rho\rangle$		179	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu u^\lambda u^\rho v_\lambda v_\rho\psi_\nu\rangle$ + H.c.	274	537
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu f_{+\nu}{}^\sigma v_\lambda v_\sigma v^\delta\psi_\rho u^T{}_\delta\rangle$		180	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u_\mu u^\rho v_\nu v_\rho\psi_\lambda\rangle$ + H.c.	275	538
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu f_{+\lambda}{}^\sigma v_\rho\psi_\sigma\rangle$		181	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u_\nu u^\rho v_\lambda v_\rho\psi_\mu\rangle$ + H.c.	276	539
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u_\nu f_{+\lambda}{}^\sigma v_\sigma\psi_\rho\rangle$		182	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u^\rho u_\mu v_\nu v_\rho\psi_\lambda\rangle$ + H.c.		540
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma f_{+\nu\lambda}v_\rho\psi_\sigma\rangle$		183	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u^\rho u_\nu v_\lambda v_\rho\psi_\mu\rangle$ + H.c.		541
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma f_{+\nu\lambda}v_\sigma\psi_\rho\rangle$		184	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu u_\nu\psi^\lambda u^T{}_\lambda\rangle$ + H.c.	277	542
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma f_{+\nu\sigma}v_\lambda\psi_\rho\rangle$		185	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu u^\lambda\psi_\nu u^T{}_\lambda\rangle$ + H.c.	278	543
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}u_\mu u^\sigma f_{+\nu}{}^\delta v_\lambda v_\sigma v_\delta\psi_\rho\rangle$		186	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu u^\lambda\psi_\lambda u^T{}_\nu\rangle$ + H.c.	279	544
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}v_\mu\psi_\nu\rangle\langle f_{+\lambda\rho}u^\sigma u_\sigma\rangle$		187	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u_\mu\psi_\nu u^T{}_\lambda\rangle$ + H.c.	280	545
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}v_\mu\psi_\nu\rangle\langle f_{+\lambda}{}^\sigma u_\rho u_\sigma\rangle$		188	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u_\nu\psi_\mu u^T{}_\lambda\rangle$ + H.c.	281	546
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}v_\mu\psi_\nu\rangle\langle f_{+\lambda}{}^\sigma u_\sigma u_\rho\rangle$		189	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u_\nu\psi_\lambda u^T{}_\mu\rangle$ + H.c.		547
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}v_\mu\psi^\sigma\rangle\langle f_{+\nu\lambda}u_\rho u_\sigma\rangle$		190	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu u^\lambda v_\nu v_\lambda\psi^\rho u^T{}_\rho\rangle$ + H.c.	282	548
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}v_\mu\psi^\sigma\rangle\langle f_{+\nu\lambda}u_\sigma u_\rho\rangle$		191	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu u^\lambda v_\nu v^\rho\psi_\lambda u^T{}_\rho\rangle$ + H.c.	283	549
$\epsilon^{\mu\nu\lambda\rho}\langle\bar{B}_{\bar{3}}v_\mu v^\sigma v^\delta\psi_\nu\rangle\langle f_{+\lambda\rho}u_\sigma u_\delta\rangle$		192	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu u^\lambda v_\lambda v^\rho\psi_\nu u^T{}_\rho\rangle$ + H.c.	284	550
$\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}u_\lambda\rangle\langle\bar{B}_{\bar{3}}u^\sigma v_\rho\psi_\sigma\rangle$		193	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u_\mu v_\nu v^\rho\psi_\lambda u^T{}_\rho\rangle$ + H.c.	285	551
$\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}u_\lambda\rangle\langle\bar{B}_{\bar{3}}u^\sigma v_\sigma\psi_\rho\rangle$		194	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u_\nu v_\lambda v^\rho\psi_\mu u^T{}_\rho\rangle$ + H.c.	286	552
$\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}u^\sigma\rangle\langle\bar{B}_{\bar{3}}u_\lambda v_\rho\psi_\sigma\rangle$		195	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u^\rho v_\nu v_\rho\psi_\mu u^T{}_\lambda\rangle$ + H.c.	287	553
$\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}u^\sigma\rangle\langle\bar{B}_{\bar{3}}u_\lambda v_\sigma\psi_\rho\rangle$		196	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}u^\rho v_\nu v_\rho\psi_\lambda u^T{}_\mu\rangle$ + H.c.		554
$\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}u^\sigma\rangle\langle\bar{B}_{\bar{3}}u_\sigma v_\lambda\psi_\rho\rangle$		197	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu\psi_\nu u^{T\lambda}u^T{}_\lambda\rangle$		555
$\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}u^\sigma\rangle\langle\bar{B}_{\bar{3}}u^\delta v_\lambda v_\sigma v_\delta\psi_\rho\rangle$		198	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu\psi^\lambda u^T{}_\nu u^T{}_\lambda\rangle$ + H.c.	288	556
$\langle\bar{B}_{\bar{3}}f_{+}{}^{\mu\nu}f_{-\mu}{}^\lambda v_\nu\psi_\lambda\rangle$	84	199	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu\psi^\lambda u^T{}_\lambda u^T{}_\nu\rangle$ + H.c.		557
$\langle\bar{B}_{\bar{3}}f_{+}{}^{\mu\nu}f_{-\mu}{}^\lambda v_\lambda\psi_\nu\rangle$	85	200	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}\psi_\mu u^T{}_\nu u^T{}_\lambda\rangle$	289	558
$\langle\bar{B}_{\bar{3}}f_{+}{}^{\mu\nu}h_\mu{}^\lambda v_\nu\psi_\lambda\rangle$	86	201	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu v_\nu v^\lambda\psi^\rho u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.	290	559
$\langle\bar{B}_{\bar{3}}f_{+}{}^{\mu\nu}h_\mu{}^\lambda v_\lambda\psi_\nu\rangle$	87	202	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu v_\nu v^\lambda\psi^\rho u^T{}_\rho u^T{}_\lambda\rangle$ + H.c.		560
$\langle\bar{B}_{\bar{3}}f_{+}{}^{\mu\nu}h^{\lambda\rho}v_\mu v_\lambda v_\rho\psi_\nu\rangle$	88	203	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu v^\lambda v^\rho\psi_\nu u^T{}_\lambda u^T{}_\rho\rangle$		561
$\langle\bar{B}_{\bar{3}}f_{+}{}^{\mu\nu}v_\mu\psi^\lambda f^T_{-\nu\lambda}\rangle$	89	204	$i\langle\bar{\psi}^\mu f_{+}{}^{\nu\lambda}v_\nu v^\rho\psi_\mu u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.	291	562
$\langle\bar{B}_{\bar{3}}f_{+}{}^{\mu\nu}v^\lambda\psi_\mu f^T_{-\nu\lambda}\rangle$	90	205	$i\langle\bar{\psi}^\mu u_\mu f_{+}{}^{\nu\lambda}u_\nu\psi_\lambda\rangle$ + H.c.	292	563
$\langle\bar{B}_{\bar{3}}f_{+}{}^{\mu\nu}v_\mu\psi^\lambda h^T_{\nu\lambda}\rangle$	91	206	$i\langle\bar{\psi}^\mu u^\nu f_{+\mu}{}^\lambda u_\nu\psi_\lambda\rangle$	293	564
$\langle\bar{B}_{\bar{3}}\nabla^\mu f_{+\mu}{}^\nu u^\lambda v_\nu\psi_\lambda\rangle$	92	207	$i\langle\bar{\psi}^\mu u^\nu f_{+\mu}{}^\lambda u_\lambda\psi_\nu\rangle$ + H.c.	294	565
$\langle\bar{B}_{\bar{3}}\nabla^\mu f_{+\mu}{}^\nu u^\lambda v_\lambda\psi_\nu\rangle$	93	208	$i\langle\bar{\psi}^\mu u^\nu f_{+\nu}{}^\lambda u_\lambda\psi_\mu\rangle$	295	566
$\langle\bar{B}_{\bar{3}}\nabla^\mu f_{+}{}^{\nu\lambda}u_\mu v_\nu\psi_\lambda\rangle$	94	209	$i\langle\bar{\psi}^\mu u_\mu f_{+}{}^{\nu\lambda}u^\rho v_\nu v_\rho\psi_\lambda\rangle$ + H.c.	296	567
$\langle\bar{B}_{\bar{3}}\nabla^\mu f_{+\mu}{}^\nu v_\nu\psi^\lambda u^T{}_\lambda\rangle$	95	210	$i\langle\bar{\psi}^\mu u^\nu f_{+\mu}{}^\lambda u^\rho v_\nu v_\rho\psi_\lambda\rangle$	297	568
$\langle\bar{B}_{\bar{3}}\nabla^\mu f_{+\mu}{}^\nu v^\lambda\psi_\nu u^T{}_\lambda\rangle$	96	211	$i\langle\bar{\psi}^\mu u^\nu f_{+\mu}{}^\lambda u^\rho v_\lambda v_\rho\psi_\nu\rangle$ + H.c.	298	569
$\langle\bar{B}_{\bar{3}}\nabla^\mu f_{+}{}^{\nu\lambda}v_\nu\psi_\mu u^T{}_\lambda\rangle$	97	212	$i\langle\bar{\psi}^\mu u^\nu f_{+\nu}{}^\lambda u^\rho v_\lambda v_\rho\psi_\mu\rangle$ + H.c.	299	570
$\langle\bar{B}_{\bar{3}}u^\mu\nabla_\mu f_{+}{}^{\nu\lambda}v_\nu\psi_\lambda\rangle$	98	213	$i\langle\bar{\psi}^\mu\psi_\mu\rangle\langle f_{+}{}^{\nu\lambda}u_\nu u_\lambda\rangle$		571
$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_{+\mu}{}^\lambda v_\nu\psi_\lambda\rangle$	99	214	$i\langle\bar{\psi}^\mu\psi^\nu\rangle\langle f_{+\mu\nu}u^\lambda u_\lambda\rangle$	300	572
$\langle\bar{B}_{\bar{3}}u^\mu\nabla^\nu f_{+\nu}{}^\lambda v_\mu\psi_\lambda\rangle$	100	215	$i\langle\bar{\psi}^\mu\psi^\nu\rangle\langle f_{+\mu}{}^\lambda u_\nu u_\lambda\rangle$ + H.c.	301	573

(Table continued)

TABLE IX. *(Continued)*

P_n	$SU(2)$	$SU(3)$	P_n	$SU(2)$	$SU(3)$
$\langle \bar{B}_{\bar{3}} u^\mu \nabla^\nu f_{+\nu}{}^\lambda v_\lambda \psi_\mu \rangle$	101	216	$i\langle \bar{\psi}^\mu \psi^\nu \rangle \langle f_{+\mu}{}^\lambda u_\lambda u_\nu \rangle + \text{H.c.}$		574
$\langle \bar{B}_{\bar{3}} u^\mu \nabla^\nu f_+{}^{\lambda\rho} v_\mu v_\nu v_\lambda \psi_\rho \rangle$	102	217	$i\langle \bar{\psi}^\mu v^\nu v^\lambda \psi_\mu \rangle \langle f_{+\nu}{}^\rho u_\lambda u_\rho \rangle + \text{H.c.}$		575
$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} f_{+\mu}{}^\lambda v_\nu \psi_\lambda \rangle$	103	218	$i\langle \bar{\psi}^\mu v^\nu v^\lambda \psi^\rho \rangle \langle f_{+\mu\nu} u_\lambda u_\rho \rangle + \text{H.c.}$	302	576
$\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} f_{+\mu}{}^\lambda v_\lambda \psi_\nu \rangle$	104	219	$i\langle \bar{\psi}^\mu v^\nu v^\lambda \psi^\rho \rangle \langle f_{+\mu\nu} u_\rho u_\lambda \rangle + \text{H.c.}$		577
$\langle \bar{B}_{\bar{3}} h^{\mu\nu} f_{+\mu}{}^\lambda v_\lambda \psi_\nu \rangle$	105	220	$i\langle \bar{\psi}^\mu v^\nu v^\lambda \psi^\rho \rangle \langle f_{+\mu\rho} u_\nu u_\lambda \rangle$	303	578
$\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu \rangle \langle f_{+\mu}{}^\lambda f_{-\nu\lambda} \rangle$	106	221	$i\langle f_{+}{}^\lambda u_\mu \rangle \langle \bar{\psi}_\nu u^\lambda \psi_\lambda \rangle + \text{H.c.}$		579
$\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu \rangle \langle f_{+\nu}{}^\lambda f_{-\mu\lambda} \rangle$	107	222	$i\langle f_{+}{}^{\mu\nu} u^\lambda \rangle \langle \bar{\psi}_\mu u_\nu \psi_\lambda \rangle + \text{H.c.}$		580
$\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu \rangle \langle f_{+\mu}{}^\lambda h_{\nu\lambda} \rangle$	108	223	$i\langle f_{+}{}^{\mu\nu} u^\lambda \rangle \langle \bar{\psi}_\mu u_\lambda \psi_\nu \rangle$		581
$\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu \rangle \langle f_{+\nu}{}^\lambda h_{\mu\lambda} \rangle$		224	$i\langle f_{+}{}^{\mu\nu} u^\lambda \rangle \langle \bar{\psi}_\mu u^\rho v_\lambda v_\rho \psi_\nu \rangle + \text{H.c.}$		582
$\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu \rangle \langle \nabla_\nu f_{+\mu}{}^\lambda u_\lambda \rangle$	109	225	$i\langle f_{+}{}^{\mu\nu} u^\lambda \rangle \langle \bar{\psi}_\mu u^\rho v_\nu v_\rho \psi_\lambda \rangle + \text{H.c.}$		583
$\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu \rangle \langle \nabla^\lambda f_{+\mu\lambda} u_\nu \rangle$	110	226	$i\langle f_{+}{}^{\mu\nu} u^\lambda \rangle \langle \bar{\psi}_\mu u^\rho v_\lambda v_\rho \psi_\nu \rangle$		584
$\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu \rangle \langle \nabla^\lambda f_{+\nu\lambda} u_\mu \rangle$	111	227	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu\lambda} f_-{}^\sigma{}_\rho \psi_\sigma \rangle + \text{H.c.}$	304	585
$\langle \bar{B}_{\bar{3}} v^\mu v^\nu v^\lambda \psi^\rho \rangle \langle f_{+\mu\rho} h_{\nu\lambda} \rangle$		228	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu}{}^\sigma f_{-\lambda\rho} \psi_\sigma \rangle + \text{H.c.}$	305	586
$\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} \nabla_\mu \nabla^\sigma f_{+\nu\sigma} v_\lambda \psi_\rho \rangle$	112	229	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu}{}^\sigma f_{-\lambda\sigma} \psi_\rho \rangle + \text{H.c.}$	306	587
$\epsilon^{\mu\nu\lambda\rho} \langle \nabla_\mu \nabla^\sigma f_{+\nu\sigma} \rangle \langle \bar{B}_{\bar{3}} v_\lambda \psi_\rho \rangle$	113		$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu\lambda} f_-{}^{\sigma\delta} v_\rho v_\sigma \psi_\delta \rangle + \text{H.c.}$	307	588
$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} f_{+\mu\nu} f_{+\lambda}{}^\sigma v_\rho \psi_\sigma \rangle$	114	230	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu}{}^\sigma f_{-\lambda}{}^\delta v_\rho v_\delta \psi_\sigma \rangle + \text{H.c.}$	308	589
$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} f_{+\mu\nu} f_{+\lambda}{}^\sigma v_\sigma \psi_\rho \rangle$	115	231	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu}{}^\sigma f_{-\sigma}{}^\delta v_\lambda v_\delta \psi_\rho \rangle + \text{H.c.}$	309	590
$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} f_{+\mu\nu} v_\lambda \psi^\sigma f_{+\rho\sigma}^T \rangle$	116	232	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu\lambda} h_\rho{}^\sigma \psi_\sigma \rangle + \text{H.c.}$	310	591
$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} f_{+\mu\nu} v^\sigma \psi_\lambda f_{+\rho\sigma}^T \rangle$	117	233	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu}{}^\sigma h_{\lambda\sigma} \psi_\rho \rangle + \text{H.c.}$	311	592
$i\epsilon^{\mu\nu\lambda\rho} \langle f_{+\mu\nu} \rangle \langle \bar{B}_{\bar{3}} f_{+\lambda}{}^\sigma v_\rho \psi_\sigma \rangle$	118		$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu\lambda} h^{\sigma\delta} v_\rho v_\sigma \psi_\delta \rangle + \text{H.c.}$	312	593
$i\epsilon^{\mu\nu\lambda\rho} \langle f_{+\mu\nu} \rangle \langle \bar{B}_{\bar{3}} f_{+\lambda}{}^\sigma v_\sigma \psi_\rho \rangle$	119		$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu\lambda} h^{\sigma\delta} v_\sigma v_\delta \psi_\rho \rangle + \text{H.c.}$	313	594
$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} u_\mu u_\nu \chi_+ v_\lambda \psi_\rho \rangle$	120	234	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu}{}^\sigma h_\lambda{}^\delta v_\rho v_\delta \psi_\sigma \rangle + \text{H.c.}$	314	595
$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} u_\mu u_\nu v_\lambda \psi_\rho \chi_+^T \rangle$	121	235	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu}{}^\sigma h_\sigma{}^\delta v_\lambda v_\delta \psi_\rho \rangle + \text{H.c.}$	315	596
$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} u_\mu \chi_+ u_\nu v_\lambda \psi_\rho \rangle$	122	236	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu\lambda} \psi^\sigma f_{-\rho\sigma}^T \rangle + \text{H.c.}$	316	597
$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} u_\mu \chi_+ v_\nu \psi_\lambda u^T{}_\rho \rangle$	123	237	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu\lambda} \psi^\sigma h_{\rho\sigma}^T \rangle + \text{H.c.}$	317	598
$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} u_\mu v_\nu \psi_\lambda u^T{}_\rho \chi_+^T \rangle$	124	238	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu f_{+\nu\lambda} v_\rho v^\sigma \psi^\delta f_{-\sigma\delta}^T \rangle + \text{H.c.}$	318	599
$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} \chi_+ u_\mu u_\nu v_\lambda \psi_\rho \rangle$		239	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu \nabla_\nu f_{+\lambda}{}^\sigma u_\rho \psi_\sigma \rangle + \text{H.c.}$	319	600
$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{B}_{\bar{3}} v_\mu \psi_\nu \rangle \langle u_\lambda u_\rho \chi_+ \rangle$		240	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu \nabla_\nu f_{+\lambda}{}^\sigma u_\sigma \psi_\rho \rangle + \text{H.c.}$	320	601
$i\epsilon^{\mu\nu\lambda\rho} \langle u_\mu \chi_+ \rangle \langle \bar{B}_{\bar{3}} u_\nu v_\lambda \psi_\rho \rangle$		241	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu \nabla^\sigma f_{+\nu\sigma} u_\lambda \psi_\rho \rangle + \text{H.c.}$	321	602
$i\epsilon^{\mu\nu\lambda\rho} \langle \chi_+ \rangle \langle \bar{B}_{\bar{3}} u_\mu u_\nu v_\lambda \psi_\rho \rangle$		242	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu \nabla_\nu f_{+\lambda}{}^\sigma u^\delta v_\rho v_\delta \psi_\sigma \rangle + \text{H.c.}$	322	603
$i\epsilon^{\mu\nu\lambda\rho} \langle \chi_+ \rangle \langle \bar{B}_{\bar{3}} u_\mu v_\nu \psi_\lambda u^T{}_\rho \rangle$		243	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu \nabla^\sigma f_{+\nu\sigma} u^\delta v_\lambda v_\delta \psi_\rho \rangle + \text{H.c.}$	323	604
$i\langle \bar{B}_{\bar{3}} u^\mu \nabla^\nu \chi_+ v_\mu \psi_\nu \rangle$	125	244	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu \nabla_\nu f_{+\lambda}{}^\sigma \psi_\rho u^T{}_\sigma \rangle$	324	605
$i\langle \bar{B}_{\bar{3}} u^\mu \nabla^\nu \chi_+ v_\nu \psi_\mu \rangle$	126	245	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu \nabla_\nu f_{+\lambda}{}^\sigma \psi_\sigma u^T{}_\rho \rangle + \text{H.c.}$	325	606
$i\langle \bar{B}_{\bar{3}} u^\mu v_\mu \psi^\nu \nabla_\nu \chi_+^T \rangle$	127	246	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu \nabla_\nu f_{+\lambda}{}^\sigma v_\rho v^\delta \psi_\sigma u^T{}_\delta \rangle + \text{H.c.}$	326	607
$i\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} \chi_+ v_\mu \psi_\nu \rangle$	128	247	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu \psi_\nu \rangle \langle f_{+\lambda}{}^\sigma f_{-\rho\sigma} \rangle$	327	608
$i\langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} v_\mu \psi_\nu \chi_+^T \rangle$	129	248	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu \psi_\nu \rangle \langle f_{+\lambda}{}^\sigma h_{\rho\sigma} \rangle$	328	609
$i\langle \bar{B}_{\bar{3}} \chi_+ f_-{}^{\mu\nu} v_\mu \psi_\nu \rangle$	130	249	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu \psi_\nu \rangle \langle \nabla_\lambda f_{+\rho}{}^\sigma u_\sigma \rangle$	329	610
$i\langle \bar{B}_{\bar{3}} \chi_+ h^{\mu\nu} v_\mu \psi_\nu \rangle$	131	250	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu \psi_\nu \rangle \langle \nabla^\sigma f_{+\lambda\sigma} u_\rho \rangle$	330	611
$i\langle \bar{B}_{\bar{3}} \nabla^\mu \chi_+ u^\nu v_\nu \psi_\mu \rangle$	132	251	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu v_\nu v^\sigma \psi_\lambda \rangle \langle f_{+\rho}{}^\delta f_{-\sigma\delta} \rangle$	331	612
$i\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu \rangle \langle u_\mu \nabla_\nu \chi_+ \rangle$	133	252	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu v_\nu v^\sigma \psi_\lambda \rangle \langle f_{+\rho}{}^\delta h_{\sigma\delta} \rangle$		613
$i\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu \rangle \langle u_\nu \nabla_\mu \chi_+ \rangle$		253	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu v_\nu v^\sigma \psi^\delta \rangle \langle f_{+\lambda\rho} h_{\sigma\delta} \rangle + \text{H.c.}$		614
$i\langle \bar{B}_{\bar{3}} v^\mu \psi^\nu \rangle \langle f_{-\mu\nu} \chi_+ \rangle$	134	254	$i\epsilon^{\mu\nu\lambda\rho} \langle \bar{\psi}_\mu v_\nu v^\sigma \psi_\lambda \rangle \langle \nabla^\delta f_{+\rho\delta} u_\sigma \rangle$	332	615
$i\langle \chi_+ \rangle \langle \bar{B}_{\bar{3}} f_-{}^{\mu\nu} v_\mu \psi_\nu \rangle$		255	$i\langle \bar{\psi}^\mu \nabla_\mu \nabla^\nu f_{+\nu}{}^\lambda \psi_\lambda \rangle + \text{H.c.}$	333	616
$i\langle \nabla^\mu \chi_+ \rangle \langle \bar{B}_{\bar{3}} u^\nu v_\nu \psi_\mu \rangle$		256	$i\langle \nabla^\mu \nabla_\mu f_+{}^{\nu\lambda} \rangle \langle \bar{\psi}_\nu \psi_\lambda \rangle$	334	

(Table continued)

TABLE IX. *(Continued)*

P_n	$SU(2)$	$SU(3)$	P_n	$SU(2)$	$SU(3)$
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} f_{+\mu\nu}\chi_+ v_\lambda\psi_\rho\rangle$	135	257	$\langle \bar\psi^\mu f_{+\mu}{}^\nu f_{+\nu}{}^\lambda\psi_\lambda\rangle$	335	617
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} f_{+\mu\nu} v_\lambda\psi_\rho\chi_+^T\rangle$	136	258	$\langle \bar\psi^\mu f_+{}^{\nu\lambda} f_{+\mu\nu}\psi_\lambda\rangle$	336	618
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}}\chi_+ f_{+\mu\nu} v_\lambda\psi_\rho\rangle$	137	259	$\langle \bar\psi^\mu f_+{}^{\nu\lambda} f_{+\nu\lambda}\psi_\mu\rangle$	337	619
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} v_\mu\psi_\nu\rangle\langle f_{+\lambda\rho}\chi_+\rangle$	138	260	$\langle \bar\psi^\mu f_{+\mu}{}^\nu f_+{}^{\lambda\rho} v_\nu v_\lambda\psi_\rho\rangle$	338	620
$\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}\rangle\langle \bar{B}_{\bar{3}}\chi_+ v_\lambda\psi_\rho\rangle$	139		$\langle \bar\psi^\mu f_+{}^{\nu\lambda} f_{+\mu}{}^\rho v_\nu v_\rho\psi_\lambda\rangle$	339	621
$\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}\rangle\langle\chi_+\rangle\langle \bar{B}_{\bar{3}} v_\lambda\psi_\rho\rangle$	140		$\langle \bar\psi^\mu f_+{}^{\nu\lambda} f_{+\nu}{}^\rho v_\lambda v_\rho\psi_\mu\rangle$	340	622
$\epsilon^{\mu\nu\lambda\rho}\langle\chi_+\rangle\langle \bar{B}_{\bar{3}} f_{+\mu\nu} v_\lambda\psi_\rho\rangle$		261	$\langle \bar\psi^\mu f_{+\mu}{}^\nu\psi^\lambda f_{+\nu\lambda}^T\rangle + \text{H.c.}$	341	623
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu\chi_- v_\mu\psi_\nu\rangle$	141	262	$\langle \bar\psi^\mu f_+{}^{\nu\lambda}\psi_\mu f_{+\nu\lambda}^T\rangle$	342	624
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu\chi_- v_\nu\psi_\mu\rangle$	142	263	$\langle \bar\psi^\mu f_{+\mu}{}^\nu v_\nu v^\lambda\psi^\rho f_{+\lambda\rho}^T\rangle + \text{H.c.}$	343	625
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu v_\mu\psi_\nu\chi_-^T\rangle$	143	264	$\langle \bar\psi^\mu f_+{}^{\nu\lambda} v_\nu v^\rho\psi_\mu f_{+\lambda\rho}^T\rangle$	344	626
$\langle \bar{B}_{\bar{3}} u^\mu u^\nu v_\nu\psi_\mu\chi_-^T\rangle$		265	$\langle \bar\psi^\mu\psi_\mu\rangle\langle f_+{}^{\nu\lambda} f_{+\nu\lambda}\rangle$	345	627
$\langle \bar{B}_{\bar{3}} u^\mu\chi_- u^\nu v_\mu\psi_\nu\rangle$	144	266	$\langle \bar\psi^\mu\psi^\nu\rangle\langle f_{+\mu}{}^\lambda f_{+\nu\lambda}\rangle$	346	628
$\langle \bar{B}_{\bar{3}} u^\mu\chi_- u^\nu v_\nu\psi_\mu\rangle$	145	267	$\langle \bar\psi^\mu v^\nu v^\lambda\psi_\mu\rangle\langle f_{+\nu}{}^\rho f_{+\lambda\rho}\rangle$	347	629
$\langle \bar{B}_{\bar{3}} u^\mu\chi_- v_\mu\psi^\nu u^T_\nu\rangle$	146	268	$\langle \bar\psi^\mu v^\nu v^\lambda\psi^\rho\rangle\langle f_{+\mu\nu} f_{+\lambda\rho}\rangle$	348	630
$\langle \bar{B}_{\bar{3}} u^\mu\chi_- v^\nu\psi_\mu u^T_\nu\rangle$	147	269	$\langle f_+{}^{\mu\nu}\rangle\langle \bar\psi_\mu f_{+\nu}{}^\lambda\psi_\lambda\rangle + \text{H.c.}$	349	
$\langle \bar{B}_{\bar{3}} u^\mu v_\mu\psi^\nu u^T_\nu\chi_-^T\rangle$	148	270	$\langle f_+{}^{\mu\nu}\rangle\langle \bar\psi_\mu f_+{}^{\lambda\rho} v_\nu v_\lambda\psi_\rho\rangle + \text{H.c.}$	350	
$\langle \bar{B}_{\bar{3}} u^\mu v^\nu\psi_\mu u^T_\nu\chi_-^T\rangle$		271	$\langle \bar\psi^\mu u_\mu u^\nu\chi_+\psi_\nu\rangle + \text{H.c.}$	351	631
$\langle \bar{B}_{\bar{3}}\chi_- u^\mu u^\nu v_\mu\psi_\nu\rangle$		272	$\langle \bar\psi^\mu u^\nu u_\mu\chi_+\psi_\nu\rangle + \text{H.c.}$	352	632
$\langle \bar{B}_{\bar{3}}\chi_- u^\mu u^\nu v_\nu\psi_\mu\rangle$		273	$\langle \bar\psi^\mu u^\nu u_\nu\chi_+\psi_\mu\rangle + \text{H.c.}$	353	633
$\langle \bar{B}_{\bar{3}} v^\mu\psi^\nu\rangle\langle u_\mu u_\nu\chi_-\rangle$		274	$\langle \bar\psi^\mu u^\nu u^\lambda\chi_+ v_\nu v_\lambda\psi_\mu\rangle + \text{H.c.}$	354	634
$\langle \bar{B}_{\bar{3}} v^\mu\psi^\nu\rangle\langle u_\nu u_\mu\chi_-\rangle$		275	$\langle \bar\psi^\mu u_\mu u^\nu\psi_\nu\chi_+^T\rangle$	355	635
$\langle u^\mu u^\nu\rangle\langle \bar{B}_{\bar{3}}\chi_- v_\mu\psi_\nu\rangle$		276	$\langle \bar\psi^\mu u^\nu u_\mu\psi_\nu\chi_+^T\rangle$		636
$\langle u^\mu\chi_-\rangle\langle \bar{B}_{\bar{3}} u^\nu v_\mu\psi_\nu\rangle$		277	$\langle \bar\psi^\mu u^\nu u_\nu\psi_\mu\chi_+^T\rangle$		637
$\langle u^\mu\chi_-\rangle\langle \bar{B}_{\bar{3}} u^\nu v_\nu\psi_\mu\rangle$		278	$\langle \bar\psi^\mu u^\nu u^\lambda v_\nu v_\lambda\psi_\mu\chi_+^T\rangle$		638
$\langle\chi_-\rangle\langle \bar{B}_{\bar{3}} u^\mu u^\nu v_\mu\psi_\nu\rangle$		279	$\langle \bar\psi^\mu u_\mu\chi_+ u^\nu\psi_\nu\rangle$	356	639
$\langle\chi_-\rangle\langle \bar{B}_{\bar{3}} u^\mu u^\nu v_\nu\psi_\mu\rangle$		280	$\langle \bar\psi^\mu u^\nu\chi_+ u_\mu\psi_\nu\rangle$	357	640
$\langle\chi_-\rangle\langle \bar{B}_{\bar{3}} u^\mu v_\mu\psi^\nu u^T_\nu\rangle$		281	$\langle \bar\psi^\mu u^\nu\chi_+ u_\nu\psi_\mu\rangle$	358	641
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} u_\mu\nabla_\nu\chi_- v_\lambda\psi_\rho\rangle$	149	282	$\langle \bar\psi^\mu u^\nu\chi_+ u^\lambda v_\nu v_\lambda\psi_\mu\rangle$	359	642
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} u_\mu v_\nu\psi_\lambda\nabla_\rho\chi_-^T\rangle$	150	283	$\langle \bar\psi^\mu u_\mu\chi_+\psi^\nu u^T_\nu\rangle + \text{H.c.}$	360	643
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} f_{-\mu\nu}\chi_- v_\lambda\psi_\rho\rangle$	151	284	$\langle \bar\psi^\mu u^\nu\chi_+\psi_\mu u^T_\nu\rangle + \text{H.c.}$	361	644
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} f_{-\mu\nu} v_\lambda\psi_\rho\chi_-^T\rangle$	152	285	$\langle \bar\psi^\mu u^\nu\chi_+\psi_\nu u^T_\mu\rangle + \text{H.c.}$	362	645
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}}\chi_- f_{-\mu\nu} v_\lambda\psi_\rho\rangle$	153	286	$\langle \bar\psi^\mu u^\nu\chi_+ v_\nu v^\lambda\psi_\mu u^T_\lambda\rangle + \text{H.c.}$	363	646
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}}\nabla_\mu\chi_- u_\nu v_\lambda\psi_\rho\rangle$	154	287	$\langle \bar\psi^\mu\psi_\mu\rangle\langle u^\nu u_\nu\chi_+\rangle$	364	647
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} v_\mu\psi_\nu\rangle\langle u_\lambda\nabla_\rho\chi_-\rangle$	155	288	$\langle \bar\psi^\mu\psi^\nu\rangle\langle u_\mu u_\nu\chi_+\rangle$	365	648
$\epsilon^{\mu\nu\lambda\rho}\langle \bar{B}_{\bar{3}} v_\mu\psi_\nu\rangle\langle f_{-\lambda\rho}\chi_-\rangle$	156	289	$\langle \bar\psi^\mu\psi^\nu\rangle\langle u_\nu u_\mu\chi_+\rangle$		649
$\epsilon^{\mu\nu\lambda\rho}\langle\chi_-\rangle\langle \bar{B}_{\bar{3}} f_{-\mu\nu} v_\lambda\psi_\rho\rangle$		290	$\langle \bar\psi^\mu v^\nu v^\lambda\psi_\mu\rangle\langle u_\nu u_\lambda\chi_+\rangle$	366	650
$\epsilon^{\mu\nu\lambda\rho}\langle\nabla_\mu\chi_-\rangle\langle \bar{B}_{\bar{3}} u_\nu v_\lambda\psi_\rho\rangle$		291	$\langle u^\mu u_\mu\rangle\langle \bar\psi^\nu\chi_+\psi_\nu\rangle$		651
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu}\chi_- v_\mu\psi_\nu\rangle$	157	292	$\langle u^\mu u^\nu\rangle\langle \bar\psi_\mu\chi_+\psi_\nu\rangle$		652
$i\langle \bar{B}_{\bar{3}} f_+{}^{\mu\nu} v_\mu\psi_\nu\chi_-^T\rangle$	158	293	$\langle u^\mu u^\nu\rangle\langle \bar\psi^\lambda\chi_+ v_\mu v_\nu\psi_\lambda\rangle$		653
$i\langle \bar{B}_{\bar{3}}\chi_- f_+{}^{\mu\nu} v_\mu\psi_\nu\rangle$	159	294	$\langle u^\mu\chi_+\rangle\langle \bar\psi_\mu u^\nu\psi_\nu\rangle + \text{H.c.}$		654
$i\langle \bar{B}_{\bar{3}} v^\mu\psi^\nu\rangle\langle f_{+\mu\nu}\chi_-\rangle$	160	295	$\langle u^\mu\chi_+\rangle\langle \bar\psi^\nu u_\mu\psi_\nu\rangle$		655
$i\langle f_+{}^{\mu\nu}\rangle\langle \bar{B}_{\bar{3}}\chi_- v_\mu\psi_\nu\rangle$	161		$\langle u^\mu\chi_+\rangle\langle \bar\psi^\nu u^\lambda v_\mu v_\lambda\psi_\nu\rangle$		656
$i\langle f_+{}^{\mu\nu}\rangle\langle\chi_-\rangle\langle \bar{B}_{\bar{3}} v_\mu\psi_\nu\rangle$	162		$\langle\chi_+\rangle\langle \bar\psi^\mu u_\mu u^\nu\psi_\nu\rangle$		657
$\epsilon^{\mu\nu\lambda\rho}\langle D^\sigma D_\sigma F_{L\mu\nu}\rangle\langle \bar{B}_{\bar{3}} v_\lambda\psi_\rho\rangle + \text{P.C.H.}$	163		$\langle\chi_+\rangle\langle \bar\psi^\mu u^\nu u_\mu\psi_\nu\rangle$		658

(Table continued)

TABLE IX. *(Continued)*

P_n	$SU(2)$	$SU(3)$	P_n	$SU(2)$	$SU(3)$
$i\langle\chi_-\rangle\langle\bar{B}_{\bar{3}}f_+{}^{\mu\nu}v_\mu\psi_\nu\rangle$		296	$\langle\chi_+\rangle\langle\bar{\psi}^\mu u^\nu u_\nu\psi_\mu\rangle$		659
$\langle\bar{\psi}^\mu u_\mu u^\nu u_\nu u^\lambda\psi_\lambda\rangle$	164	297	$\langle\chi_+\rangle\langle\bar{\psi}^\mu u^\nu u^\lambda v_\nu v_\lambda\psi_\mu\rangle$		660
$\langle\bar{\psi}^\mu u_\mu u^\nu u^\lambda u_\nu\psi_\lambda\rangle$ + H.c.	165	298	$\langle\chi_+\rangle\langle\bar{\psi}^\mu u_\mu\psi^\nu u^T{}_\nu\rangle$ + H.c.		661
$\langle\bar{\psi}^\mu u_\mu u^\nu u^\lambda u_\lambda\psi_\nu\rangle$ + H.c.		299	$\langle\chi_+\rangle\langle\bar{\psi}^\mu u^\nu\psi_\mu u^T{}_\nu\rangle$		662
$\langle\bar{\psi}^\mu u^\nu u_\mu u^\lambda u_\nu\psi_\lambda\rangle$	166	300	$\langle\chi_+\rangle\langle\bar{\psi}^\mu u^\nu v_\nu v^\lambda\psi_\mu u^T{}_\lambda\rangle$		663
$\langle\bar{\psi}^\mu u^\nu u_\mu u^\lambda u_\lambda\psi_\nu\rangle$ + H.c.	167	301	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu\nabla_\lambda\chi_+\psi_\rho\rangle$ + H.c.	367	664
$\langle\bar{\psi}^\mu u^\nu u_\nu u^\lambda u_\lambda\psi_\mu\rangle$	168	302	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu\nabla^\sigma\chi_+v_\lambda v_\sigma\psi_\rho\rangle$ + H.c.	368	665
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\mu u_\nu\psi_\lambda\rangle$		303	$\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu f_{-\nu\lambda}\chi_+\psi_\rho\rangle$ + H.c.	369	666
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\mu u_\lambda\psi_\nu\rangle$ + H.c.		304	$\langle\bar{\psi}^\mu\nabla_\mu\nabla^\nu\chi_+\psi_\nu\rangle$ + H.c.	370	667
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\nu u_\lambda\psi_\mu\rangle$	169	305	$\langle\bar{\psi}^\mu\nabla^\nu\nabla_\nu\chi_+\psi_\mu\rangle$	371	668
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\lambda u_\mu\psi_\nu\rangle$		306	$\langle\nabla^\mu\nabla_\mu\chi_+\rangle\langle\bar{\psi}^\nu\psi_\nu\rangle$	372	669
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\lambda u_\nu\psi_\mu\rangle$		307	$\langle\nabla^\mu\nabla^\nu\chi_+\rangle\langle\bar{\psi}_\mu\psi_\nu\rangle$ + H.c.	373	670
$\langle\bar{\psi}^\mu u_\mu u^\nu u^\lambda u^\rho v_\nu v_\lambda\psi_\rho\rangle$	170	308	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu\chi_+\psi_\nu\rangle$ + H.c.	374	671
$\langle\bar{\psi}^\mu u_\mu u^\nu u^\lambda u^\rho v_\nu v_\rho\psi_\lambda\rangle$ + H.c.	171	309	$i\langle\bar{\psi}^\mu f_{+\mu}{}^\nu\psi_\nu\chi_+^T\rangle$	375	672
$\langle\bar{\psi}^\mu u_\mu u^\nu u^\lambda u^\rho v_\lambda v_\rho\psi_\nu\rangle$ + H.c.		310	$i\langle\bar{\psi}^\mu\psi^\nu\rangle\langle f_{+\mu\nu}\chi_+\rangle$	376	673
$\langle\bar{\psi}^\mu u^\nu u_\mu u^\lambda u^\rho v_\nu v_\rho\psi_\lambda\rangle$	172	311	$i\langle f_+{}^{\mu\nu}\rangle\langle\bar{\psi}_\mu\chi_+\psi_\nu\rangle$	377	
$\langle\bar{\psi}^\mu u^\nu u_\mu u^\lambda u^\rho v_\lambda v_\rho\psi_\nu\rangle$ + H.c.	173	312	$i\langle f_+{}^{\mu\nu}\rangle\langle\chi_+\rangle\langle\bar{\psi}_\mu\psi_\nu\rangle$	378	
$\langle\bar{\psi}^\mu u^\nu u_\nu u^\lambda u^\rho v_\lambda v_\rho\psi_\mu\rangle$ + H.c.	174	313	$i\langle\chi_+\rangle\langle\bar{\psi}^\mu f_{+\mu}{}^\nu\psi_\nu\rangle$		674
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\mu u^\rho v_\lambda v_\rho\psi_\nu\rangle$ + H.c.		314	$\langle\bar{\psi}^\mu\chi_+^2\psi_\mu\rangle$	379	675
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\mu u^\rho v_\nu v_\rho\psi_\lambda\rangle$		315	$\langle\bar{\psi}^\mu\chi_+\psi_\mu\chi_+^T\rangle$	380	676
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\nu u^\rho v_\lambda v_\rho\psi_\mu\rangle$ + H.c.	175	316	$\langle\bar{\psi}^\mu\psi_\mu\rangle\langle\chi_+^2\rangle$	381	677
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\lambda u^\rho v_\nu v_\rho\psi_\mu\rangle$		317	$\langle\chi_+\rangle\langle\bar{\psi}^\mu\chi_+\psi_\mu\rangle$		678
$\langle\bar{\psi}^\mu u^\nu u^\lambda u^\rho u_\mu v_\lambda v_\rho\psi_\nu\rangle$		318	$\langle\chi_+\rangle\langle\chi_+\rangle\langle\bar{\psi}^\mu\psi_\mu\rangle$		679
$\langle\bar{\psi}^\mu u^\nu u^\lambda u^\rho u_\nu v_\lambda v_\rho\psi_\mu\rangle$		319	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu u_\lambda\chi_-\psi_\rho\rangle$ + H.c.	382	680
$\langle\bar{\psi}^\mu u^\nu u^\lambda u^\rho u^\sigma v_\nu v_\lambda v_\rho v_\sigma\psi_\mu\rangle$	176	320	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu u^\sigma\chi_-v_\lambda v_\sigma\psi_\rho\rangle$ + H.c.		681
$\langle\bar{\psi}^\mu u_\mu u^\nu u_\nu\psi^\lambda u^T{}_\lambda\rangle$ + H.c.	177	321	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu u_\lambda\psi_\rho\chi_-^T\rangle$	383	682
$\langle\bar{\psi}^\mu u_\mu u^\nu u^\lambda\psi_\nu u^T{}_\lambda\rangle$ + H.c.	178	322	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu\chi_-u_\lambda\psi_\rho\rangle$	384	683
$\langle\bar{\psi}^\mu u_\mu u^\nu u^\lambda\psi_\lambda u^T{}_\nu\rangle$	179	323	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu\chi_-\psi_\lambda u^T{}_\rho\rangle$ + H.c.	385	684
$\langle\bar{\psi}^\mu u^\nu u_\mu u_\nu\psi^\lambda u^T{}_\lambda\rangle$ + H.c.		324	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu u_\nu\chi_-v_\lambda v^\sigma\psi_\rho u^T{}_\sigma\rangle$ + H.c.	386	685
$\langle\bar{\psi}^\mu u^\nu u_\mu u^\lambda\psi_\nu u^T{}_\lambda\rangle$ + H.c.		325	$i\epsilon^{\mu\nu\lambda\rho}\langle\bar{\psi}_\mu\psi_\nu\rangle\langle u_\lambda u_\rho\chi_-\rangle$		686
$\langle\bar{\psi}^\mu u^\nu u_\nu u_\mu\psi^\lambda u^T{}_\lambda\rangle$ + H.c.		326	$i\epsilon^{\mu\nu\lambda\rho}\langle\chi_-\rangle\langle\bar{\psi}_\mu u_\nu u_\lambda\psi_\rho\rangle$		687
$\langle\bar{\psi}^\mu u^\nu u_\nu u^\lambda\psi_\mu u^T{}_\lambda\rangle$ + H.c.	180	327	$i\langle\bar{\psi}^\mu u_\mu\nabla^\nu\chi_-\psi_\nu\rangle$ + H.c.	387	688
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\mu\psi_\nu u^T{}_\lambda\rangle$		328	$i\langle\bar{\psi}^\mu u^\nu\nabla_\mu\chi_-\psi_\nu\rangle$ + H.c.	388	689
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\nu\psi_\mu u^T{}_\lambda\rangle$	181	329	$i\langle\bar{\psi}^\mu u^\nu\nabla_\nu\chi_-\psi_\mu\rangle$ + H.c.	389	690
$\langle\bar{\psi}^\mu u_\mu u^\nu u^\lambda v_\nu v_\lambda\psi^\rho u^T{}_\rho\rangle$ + H.c.	182	330	$i\langle\bar{\psi}^\mu u^\nu\nabla^\lambda\chi_-v_\nu v_\lambda\psi_\mu\rangle$ + H.c.	390	691
$\langle\bar{\psi}^\mu u_\mu u^\nu u^\lambda v_\nu v^\rho\psi_\lambda u^T{}_\rho\rangle$	183	331	$i\langle\bar{\psi}^\mu u_\mu\psi^\nu\nabla_\nu\chi_-^T\rangle$ + H.c.	391	692
$\langle\bar{\psi}^\mu u_\mu u^\nu u^\lambda v_\lambda v^\rho\psi_\nu u^T{}_\rho\rangle$ + H.c.	184	332	$i\langle\bar{\psi}^\mu u^\nu\psi_\mu\nabla_\nu\chi_-^T\rangle$	392	693
$\langle\bar{\psi}^\mu u^\nu u_\mu u^\lambda v_\nu v_\lambda\psi^\rho u^T{}_\rho\rangle$ + H.c.		333	$i\langle\bar{\psi}^\mu f_{-\mu}{}^\nu\chi_-\psi_\nu\rangle$ + H.c.	393	694
$\langle\bar{\psi}^\mu u^\nu u_\mu u^\lambda v_\lambda v^\rho\psi_\nu u^T{}_\rho\rangle$ + H.c.		334	$i\langle\bar{\psi}^\mu h_\mu{}^\nu\chi_-\psi_\nu\rangle$ + H.c.	394	695
$\langle\bar{\psi}^\mu u^\nu u_\nu u^\lambda v_\lambda v^\rho\psi_\mu u^T{}_\rho\rangle$ + H.c.	185	335	$i\langle\bar{\psi}^\mu h_\mu{}^\nu\psi_\nu\chi_-^T\rangle$	395	696
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\mu v_\nu v_\lambda\psi^\rho u^T{}_\rho\rangle$ + H.c.		336	$i\langle\bar{\psi}^\mu\psi_\mu\rangle\langle u^\nu\nabla_\nu\chi_-\rangle$	396	697
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\mu v_\lambda v^\rho\psi_\nu u^T{}_\rho\rangle$		337	$i\langle\bar{\psi}^\mu\psi^\nu\rangle\langle u_\mu\nabla_\nu\chi_-\rangle$ + H.c.	397	698
$\langle\bar{\psi}^\mu u^\nu u^\lambda u_\nu v_\lambda v^\rho\psi_\mu u^T{}_\rho\rangle$	186	338	$i\langle\bar{\psi}^\mu\psi^\nu\rangle\langle h_{\mu\nu}\chi_-\rangle$	398	699
$\langle\bar{\psi}^\mu u^\nu u^\lambda u^\rho v_\nu v_\lambda\psi_\mu u^T{}_\rho\rangle$ + H.c.	187	339	$i\langle\bar{\psi}^\mu v^\nu v^\lambda\psi_\mu\rangle\langle u_\nu\nabla_\lambda\chi_-\rangle$		700

(Table continued)

TABLE IX. *(Continued)*

P_n	$SU(2)$	$SU(3)$	P_n	$SU(2)$	$SU(3)$
$\langle\bar\psi u^\nu u^\lambda u^\rho v_\nu v_\rho \psi_\mu u^T{}_\lambda\rangle$		340	$i\langle\chi_-\rangle\langle\bar\psi^\mu h_\mu{}^\nu \psi_\nu\rangle$		701
$\langle\bar\psi u^\nu u^\lambda u^\rho v_\nu v_\lambda v_\rho v^\sigma \psi_\mu u^T{}_\sigma\rangle$	188	341	$i\langle\nabla^\mu\chi_-\rangle\langle\bar\psi_\mu u^\nu\psi_\nu\rangle$ + H.c.		702
$\langle\bar\psi u_\mu u^\nu \psi_\nu u^{T\lambda} u^T{}_\lambda\rangle$		342	$i\langle\nabla^\mu\chi_-\rangle\langle\bar\psi^\nu u_\mu\psi_\nu\rangle$		703
$\langle\bar\psi u_\mu u^\nu \psi^\lambda u^T{}_\nu u^T{}_\lambda\rangle$ + H.c.	189	343	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu f_{+\nu\lambda}\chi_-\psi_\rho\rangle$ + H.c.	399	704
$\langle\bar\psi u_\mu u^\nu \psi^\lambda u^T{}_\lambda u^T{}_\nu\rangle$ + H.c.		344	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu f_{+\nu\lambda}\psi_\rho\chi_-^T\rangle$	400	705
$\langle\bar\psi u^\nu u_\mu \psi_\nu u^{T\lambda} u^T{}_\lambda\rangle$		345	$\epsilon^{\mu\nu\lambda\rho}\langle\bar\psi_\mu\psi_\nu\rangle\langle f_{+\lambda\rho}\chi_-\rangle$	401	706
$\langle\bar\psi u^\nu u_\mu \psi^\lambda u^T{}_\nu u^T{}_\lambda\rangle$ + H.c.		346	$\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}\rangle\langle\bar\psi_\lambda\chi_-\psi_\rho\rangle$	402	
$\langle\bar\psi u^\nu u_\nu \psi_\mu u^{T\lambda} u^T{}_\lambda\rangle$		347	$\epsilon^{\mu\nu\lambda\rho}\langle f_{+\mu\nu}\rangle\langle\chi_-\rangle\langle\bar\psi_\lambda\psi_\rho\rangle$	403	
$\langle\bar\psi u^\nu u^\lambda \psi_\mu u^T{}_\nu u^T{}_\lambda\rangle$	190	348	$\epsilon^{\mu\nu\lambda\rho}\langle\chi_-\rangle\langle\bar\psi_\mu f_{+\nu\lambda}\psi_\rho\rangle$		707
$\langle\bar\psi u^\nu u^\lambda \psi_\mu u^T{}_\lambda u^T{}_\nu\rangle$		349	$\langle\bar\psi^\mu\chi_-^2\psi_\mu\rangle$	404	708
$\langle\bar\psi u_\mu u^\nu v_\nu v^\lambda \psi^\rho u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.	191	350	$\langle\bar\psi^\mu\chi_-\psi_\mu\chi_-^T\rangle$	405	709
$\langle\bar\psi u_\mu u^\nu v_\nu v^\lambda \psi^\rho u^T{}_\rho u^T{}_\lambda\rangle$ + H.c.		351	$\langle\chi_-\rangle\langle\bar\psi^\mu\chi_-\psi_\mu\rangle$	406	710
$\langle\bar\psi u_\mu u^\nu v^\lambda v^\rho \psi_\nu u^T{}_\lambda u^T{}_\rho\rangle$		352	$\langle\chi_-\rangle\langle\chi_-\rangle\langle\bar\psi^\mu\psi_\mu\rangle$		711
$\langle\bar\psi u^\nu u_\mu v_\nu v^\lambda \psi^\rho u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.		353	$\langle\bar\psi^\mu\psi_\mu\rangle\langle F_L{}^{\nu\lambda}F_{L\nu\lambda}\rangle$ + P.	407	712
$\langle\bar\psi u^\nu u_\mu v^\lambda v^\rho \psi_\nu u^T{}_\lambda u^T{}_\rho\rangle$		354	$\langle\bar\psi^\mu v^\nu v^\lambda\psi_\mu\rangle\langle F_{L\nu}{}^\rho F_{L\lambda\rho}\rangle$ + P.	408	713
$\langle\bar\psi u^\nu u_\nu v^\lambda v^\rho \psi_\mu u^T{}_\lambda u^T{}_\rho\rangle$		355	$\langle F_L{}^{\mu\nu}\rangle\langle F_{L\mu\nu}\rangle\langle\bar\psi^\lambda\psi_\lambda\rangle$ + P.	409	
$\langle\bar\psi u^\nu u^\lambda v_\nu v^\rho \psi_\mu u^T{}_\lambda u^T{}_\rho\rangle$ + H.c.	192	356	$\langle F_L{}^{\mu\nu}\rangle\langle F_{L\mu}{}^\lambda\rangle\langle\bar\psi^\rho v_\nu v_\lambda\psi_\rho\rangle$ + P.	410	
$\langle\bar\psi u^\nu u^\lambda v_\nu v^\rho \psi_\mu u^T{}_\rho u^T{}_\lambda\rangle$ + H.c.		357	$\langle\bar\psi^\mu\psi_\mu\rangle\langle\chi\chi^\dagger\rangle$	411	714
$\langle\bar\psi u^\nu u^\lambda v_\nu v_\lambda v^\rho v^\sigma \psi_\mu u^T{}_\rho u^T{}_\sigma\rangle$		358	$\langle\bar\psi^\mu \det\chi\psi_\mu\rangle$ + H.c.	412	

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