Erratum: BPS-saturated walls in supersymmetric theories [Phys. Rev. D 56, 7990 (1997)]

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(Published 27 October 1998)

[S0556-2821(98)06124-4]

PACS number(s): 11.27.+d, 11.30.Pb, 12.60.Jv, 99.10.+g

In Eq. (A12) and the following unnumbered equation, the sign in front of i must be changed. The correct definition of the sigma matrices is as follows:

$$\sigma_{\alpha\beta}=\{-\tau^3;i\mathbf{1};\tau^1\};\quad \sigma_{\dot\alpha\dot\beta}=\{-\tau^3;-i\mathbf{1};\tau^1\};$$

$$\sigma^{\alpha\beta}=\{\tau^3;i\mathbf{1};-\tau^1\};\quad \sigma^{\dot\alpha\dot\beta}=\{\tau^3;-i\mathbf{1};-\tau^1\}. \tag{1}$$

The relative signs in Eq. (A17) must be changed as follows:

$$Q_\alpha=-i\frac{\partial}{\partial\theta^\alpha}+\partial_{\alpha\dot\alpha}\bar\theta^{\dot\alpha},$$

$$\bar Q_{\dot\alpha}=i\frac{\partial}{\partial\bar\theta^{\dot\alpha}}-\theta^\alpha\partial_{\alpha\dot\alpha}. \tag{2}$$

In Eqs. (13), (14), (16), (29), (31), (40), (42), (43), (A29), (A30), (A42), (A46) the matrix $\sigma_{\alpha\beta}$ must be replaced by $(-i\ \sigma_{\alpha\beta})$. As a consequence, Eq. (21) becomes

$$\mathcal{E}(|\beta^1|^2+|\beta^2|^2)+2\ \mathrm{Im}(\beta^1\beta^2\bar\Sigma)A\geqslant 0, \tag{3}$$

and the unnumbered equation after Eq. (22) takes the form

$$\beta^1=-i\beta^2=be^{i\alpha/2}.$$

This replacement has no consequences for the observable quantities.

In Eq. (121) the normalization factors $\sqrt{i\lambda_n}$ and $\sqrt{i\kappa_n}$ should be replaced by $\sqrt{\lambda_n}$ and $\sqrt{\kappa_n}$, respectively. Correspondingly, the words ''. . . where the factors $\sqrt{i\lambda_n}$ and $\sqrt{i\kappa_n}$ . . .'' in the line adjacent to Eq. (121) should be replaced by ''. . . where the factors $\sqrt{\lambda_n}$ and $\sqrt{\kappa_n}$ . . . .'' Then, the fields α_n and β_n in Eq. (129) and Eq. (B5) should be defined as follows:

$$\alpha_n=\frac{\Psi_n^+ + i\Psi_n^-}{\sqrt{2}};\quad \beta_n=\frac{\Psi_n^+ - i\Psi_n^-}{\sqrt{2}}. \tag{4}$$

The summation convention used throughout the section is as follows:

$$\Psi\Psi=\Psi^\alpha\Psi_\alpha;\quad \Psi\hat\partial\Psi=\Psi^\alpha\hat\partial_\alpha^\beta\Psi_\beta;\quad \hat\partial_\alpha^\beta=(\partial^0\tau^3-i\partial^1\tau^2+i\partial^2\tau^1)_{\alpha\beta}. \tag{5}$$

In Sec. VI the one-loop correction to the soliton mass was discussed. While the final conclusion—occurrence of a nonvanishing mass correction—stays intact, the origin of the correction was not properly identified. Namely, the bulk effect (reflected in the distinct densities of the eigenstates for two operators considered) is due to imposing nonsupersymmetric boundary conditions. If the boundary conditions are imposed in a supersymmetric manner, all the bulk effects in the renormalization of the soliton mass cancel (much in the same way as in the case of the domain wall in the previous sections). The soliton mass correction results from boundary terms that appear in the two-dimensional models with the minimal supersymmetry, where SUSY is not chiral. These boundary terms play no role in two-dimensional models with the extended supersymmetry, $\mathcal{N}=2$. In such models the soliton mass is not renormalized, analogously to the domain wall tension.

For more details see M. Shifman, A. Vainshtein, and M. Voloshin (to be published).

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