Karnaukhov Replies: In a recent Letter [1] a new integrable model of fermions with correlated hopping between the nearest-neighbor pair of lattice sites was proposed. Straightforward calculation which is evident from the model Hamiltonian [see formula (1) of the preceding Comment [2]] shows that the general solution for the two-particle scattering matrix (S matrix), which satisfies a Yang-Baxter equation, has the form

$$S_{12} = \frac{\vartheta(k_1) - \vartheta(k_2) \pm iP_{12}}{\vartheta(k_1) - \vartheta(k_2) \pm i}, \tag{1}$$

where, for the case (a) $\vartheta(k) = [t_2/2(t_0 - t_2)]\tan(k/2)$ if $t_3 = t_2 - t_0$, and for the case (b) $\vartheta(k) = [t_2/2(t_0 - t_2)]\cot(k/2)$ if $t_3 = t_0 - t_2$, P_{ij} is the spin permutation operator. We use the notations for the hopping integrals from [1] and the preceding Comment [2]. The upper and lower signs correspond to cases (a) and (b), respectively.

The model is integrable if additional constraints on the coupling constants take place:

$$U = -2t_3, \qquad t_2 t_0 = t_1^2. \tag{2}$$

This solution generalizes ones obtained earlier for this model in [1] and the preceding Comment [2]. The solution of the S matrix reported by Bedürftig and Frahm [formula (3) in [2]] takes into account only one branch of solution (1), namely the branch (a). The special cases of solution for the S matrix have been obtained in [1] for the condition $t_1^2 = t_0^2/2$ and for case (a) if $t_3 = -t_0/2$ and case (b) if $t_3 = t_0/2$. It is easily seen that these solutions correspond to the value of $\alpha = t_0/t_2 = 2$ in the notation of Comment [2] for the branch (a) if $t_3 = -t_0/2$ and for the branch (b) if $t_3 = t_0/2$. Bedürftig and Frahm mistakenly reasoned that these solutions satisfy the values of $\alpha = 2$ and $\alpha = 1/2$ for the branch (a). In [3] the asymptotics of correlation functions for this model were calculated for the antiferromagnetic ground state at $\alpha = 2$ in the case (b), since there is no point in commentation on Bedürftig and Frahm's critiques about these calculations.

The statement that without an external magnetic field the ground state is found to be a spin singlet for *all* densities, which is confirmed by the result of calculation of the energy difference between antiferromagnetic and ferromagnetic states in the small density limit for case (a) at $\alpha = 2$, should be more evidently proved. In the supersymmetric t-J model, both antiferrromagnetic and ferromagnetic states are realized in the absence of a magnetic field [4].

The detailed calculations of the model, which correspond to solution (1) for the S matrix, will be published elsewhere [5].

This work was supported in part by the International Science Foundation under Grant No. U5B 000.

Igor N. Karnaukhov
Institute of Metal Physics
Vernadsky Street 36
252142 Kiev, Ukraine

Received 21 April 1995
PACS numbers: 71.28.+d, 75.10.Jm

[1] I. N. Karnaukhov, Phys. Rev. Lett. **73**, 1130 (1994).
[2] G. Bedürftig and H. Frahm, preceding Comment, Phys. Rev. Lett. **74**, 5284 (1995).
[3] I. N. Karnaukhov, Phys. Rev. B **51** (1995).
[4] P. Schlottmann, Phys. Rev. B **36**, 5177 (1987).
[5] I. N. Karnaukhov (to be published).

0031-9007/95/74(26)/5285(1)$06.00