

About linear Superpositions of Special Exact Solutions of Veselov-Novikov Equation

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New exact solutions, nonstationary and stationary, of Veselov-Novikov(VN) equation in the forms of linear superpositions of arbitrary number of exact special solutions $u^{(n)}$, $n=1, \dots, N$ are constructed via $\bar{\partial}$ -dressing method of Zakharov and Manakov in such a way that the sums $u = u^{(k_1)} + u^{(k_2)} + \dots + u^{(k_m)}$, $1 \leq k_1 < k_2 < \dots < k_m \leq N$ of arbitrary subsets of these solutions are also exact solutions of VN equation. The presented linear superpositions include as superpositions of special line solitons with zero asymptotic values at infinity and also superpositions of special plane wave type singular periodic solutions. By construction these exact solutions represent also new exact transparent potentials of 2D stationary Schroedinger equation.