

Its, A. R.

Asymptotics of solutions of the nonlinear Schrödinger equation and isomonodromic deformations of systems of linear differential equations. (English. Russian original) [Zbl 0534.35028](#)
Sov. Math., Dokl. 24, 452-456 (1981); translation from *Dokl. Akad. Nauk SSSR* 261, 14-18 (1981).

In this paper the problem of constructing asymptotics as $t \rightarrow +\infty$ and for a fixed ratio $x/4t = \lambda_0$ of the solution of the Cauchy problem for the nonlinear Schrödinger equation $ip_t + p_{xx} - 8|p|^2p = 0$ in the class of rapidly decreasing data is considered. In correspondence with the method of the inverse problem, the solution of the problem reduces to asymptotically solving the Riemann problem which determines a matrix-valued function $\psi(x, t, \lambda)$ which is analytic in λ for $\text{Im } \lambda \neq 0$, and with certain specified properties. This is achieved by converting the Riemann problem into one which is exactly solvable. The results are described in Theorem 1 and a sketch of the proof is given.

Reviewer: V.K.Kumar

MSC:

- [35J10](#) Schrödinger operator, Schrödinger equation
- [35B40](#) Asymptotic behavior of solutions to PDEs
- [35Q15](#) Riemann-Hilbert problems in context of PDEs

Cited in **2** Reviews
Cited in **22** Documents

Keywords:

asymptotics; nonlinear Schrödinger equation; isomonodromic deformations; linear differential equations; inverse problem; Cauchy problem; Riemann problem