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Asymptotic behavior of solutions for $t \rightarrow \infty$ of the equation $\psi_{xx} + u(x, t)\psi + (\lambda/4)\psi = 0$ with a potential u satisfying the Korteweg-de Vries equation. (Russian) Zbl 0606.35078
Probl. Mat. Fiz. 11, 78-113 (1986).

The formal transition \hat{s} and reflection \hat{r} coefficients are studied in detail for the spectral Schrödinger equation with the potential u asymptotic for $t \rightarrow \infty$. In the distinguished classes of potentials and reflection coefficients the inverse problem of the scattering theory is considered. If the reflection coefficient \hat{r} can be reduced to the highest order term then the corresponding potential u satisfies the formal Korteweg-de Vries equation. These results are used for a rigorous proof of the complete asymptotic description of the solution of the Cauchy problem for the Korteweg-de Vries equation for $t \rightarrow \infty$. The proof is based on the integral equation of the inverse problem of the scattering theory.

Reviewer: O.Dumbrajs

MSC:

- 35Q99** Partial differential equations of mathematical physics and other areas of application Cited in 2 Documents
- 35R30** Inverse problems for PDEs
- 35P25** Scattering theory for PDEs
- 35B40** Asymptotic behavior of solutions to PDEs
- 35G25** Initial value problems for nonlinear higher-order PDEs

Keywords:

transition; reflection; spectral Schrödinger equation; inverse problem; scattering; Korteweg-de Vries equation; asymptotic description; Cauchy problem