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Finding eigenvalue problems for solving nonlinear evolution equations. (English)

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Summary: The problem of determining what nonlinear evolution equations are exactly solvable by inverse scattering techniques is simplified by considering a linear limit. By linearizing a given eigenvalue problem and the associated time evolution operator, it is possible to determine the class of linearized dispersion relation(s) of the exactly solvable nonlinear evolution equations. Examples are given to illustrate the method.

MSC:

- 37J35** Completely integrable finite-dimensional Hamiltonian systems, integration methods, integrability tests
- 35Q55** NLS equations (nonlinear Schrödinger equations)
- 35P25** Scattering theory for PDEs
- 35G20** Nonlinear higher-order PDEs
- 35P30** Nonlinear eigenvalue problems and nonlinear spectral theory for PDEs

Cited in **17** Documents

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