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Quantum completely integrable models in field theory. (English) Zbl 0569.35064
Sov. Sci. Rev., Sect. C, Math. Phys. Rev. 1, 107-155 (1980).

This paper reviews the first state of the quantum version of the inverse scattering transform (QIST) method to investigate a special class of two-dimensional models in quantum field theory and statistical physics. In the first section the main aspects of the classical IST method is explained using examples of the sine-Gordon equation, nonlinear Schrödinger equation, Heisenberg ferromagnet model and Toda chain. In the second section the general program of the quantum approach is presented. The quantum models corresponding to the above equations are discussed. The general considerations are illustrated in section 3 by using the nonlinear Schrödinger model. Two other examples are discussed more briefly in section 4: these are the sine-Gordon model and XYZ-model of the quantum theory of magnetism.

A further development of the QIST method is reviewed in: "Integrable models in $I + I$ dimensional quantum field theory", CEN Saclay (France), 50 p. (1982). "Recent development in gauge theory and integrable systems", Kyoto Univ. Res. Inst. Math. Sci., 53-71 (1982).

Reviewer: [P.Holod](#)

MSC:

- 35Q99** Partial differential equations of mathematical physics and other areas of application
- 81T08** Constructive quantum field theory
- 82B10** Quantum equilibrium statistical mechanics (general)

Cited in **1** Review
Cited in **76** Documents

Keywords:

reviews; inverse scattering transform; quantum field theory; statistical physics; sine-Gordon equation; nonlinear Schrödinger equation; Heisenberg ferromagnet model; Toda chain