

**Gutkin, Eugène**

**Quantum nonlinear Schrödinger equation. I: Intertwining operators.** (English) Zbl 0614.35086  
*Ann. Inst. Henri Poincaré, Anal. Non Linéaire* 3, 285-314 (1986).

The quantum nonlinear Schrödinger equation is studied as a model of the quantum (nonrelativistic) field theory in  $1 + 1$  dimensions. In § 1 the calculus of intertwining operators  $P_N, P_N^*, P_N^{*-1}, P_N^{-1}$  on  $\mathcal{H}_N$  is developed which produce the equivalence of the  $N$ -particle Hamiltonian  $H_N$  and the free Hamiltonian  $-\Delta_N$ . In § 2 the intertwining operators on the Fock space are studied, which are the direct sums of the corresponding operators on  $\mathcal{H}_N$ . This calculus is supposed to be the basis for subsequent publications on the explicit solution of an initial value problem for the nonlinear Schrödinger equation.

Reviewer: [J. Weidmann](#)

**MSC:**

- [35Q99](#) Partial differential equations of mathematical physics and other areas of application  
[35G20](#) Nonlinear higher-order PDEs  
[81T08](#) Constructive quantum field theory

Cited in **1** Review  
Cited in **3** Documents

**Keywords:**

[delta Bose gas](#); [Bethe ansatz](#); [commutation relations](#); [second quantization](#); [quantum nonlinear Schrödinger equation](#); [field theory](#); [intertwining operators](#); [Hamiltonian](#); [Fock space](#)

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