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**Riemann-Hilbert approach for the integrable nonlocal nonlinear Schrödinger equation with step-like initial data.** (English) [Zbl 1424.35316](#)

Visn. Khark. Univ., Ser. Mat. Prykl. Mat. Mekh. 88, 4-16 (2018).

Summary: We study the Cauchy problem for the integrable nonlocal nonlinear Schrödinger (NNLS) equation

$$iq_t(x, t) + q_{xx}(x, t) + 2q^2(x, t)\bar{q}(-x, t) = 0$$

with a step-like initial data:  $q(x, 0) = o(1)$  as  $x \rightarrow -\infty$  and  $q(x, 0) = A + o(1)$  as  $x \rightarrow \infty$ , where  $A > 0$  is an arbitrary constant. We develop the inverse scattering transform method for this problem in the form of the Riemann-Hilbert approach and obtain a representation of the solution of the Cauchy problem in terms of the solution of an associated Riemann-Hilbert-type analytic factorization problem, which can be efficiently used for further studying the properties of the solution, including the large time asymptotic behavior.

**MSC:**

[35Q55](#) NLS equations (nonlinear Schrödinger equations)

[35Q15](#) Riemann-Hilbert problems in context of PDEs

Cited in **3** Documents

**Keywords:**

nonlocal nonlinear Schrödinger equation; inverse scattering transform method; Riemann-Hilbert problem

**Full Text:** [Link](#)