ON THE ILL-POSEDNESS FOR A NONLINEAR SCHRÖDINGER-AIRY EQUATION

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Abstract. Using ideas of Kenig Ponce and Vega and an explicit solution with two parameters we prove that the solution map of the initial value problem for a particular nonlinear Schrödinger-Airy equation

$$\partial_t u + ia \partial_x^2 u + b \partial_x^3 u + ic |u|^2 u + d |u|^2 \partial_x u + e u^2 \partial_x \overline{u} = 0, \quad x, t \in \mathbb{R},$$

fails to be uniformly continuous.

We also approximate the nonlinear Schrödinger-Airy equation by the cubic nonlinear Schrödinger equation and prove ill-posedness in the more general case. This method was originally introduced by Christ, Colliander and Tao for the modified Korteweg-de Vries equation.

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