Novel Integrable 2D NLS Equation Through Hidden Hierarchy and Modelling the Rogue Wave

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ABSTRACT

We unravel hidden integrable hierarchies of the nonlinear Schroedinger equation together with its novel sets of conserved quantities. This also yields an integrable 2D NLS equation, giving exact stable soliton solution as well as an exact 2D lump soliton with interesting geometry, which can model perfectly oceanic rogue waves, solving thus a challenging problem.