New optical solitons of Kundu-Eckhaus equation via λ-symmetry

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Abstract

New closed-form exact solutions for the nonlinear Kundu-Eckahus (KE) equation with generalized coefficients are obtained. A travelling wave transformation reduces the KE equation to a second-order ordinary differential equation that is completely integrated by using the λ-symmetry approach. A one-parameter family of singular solutions of the reduced equation provides a unified expression for a class of solutions for the KE equation which contains, as particular cases, most of the exact solutions derived during the last years by using a great variety of powerful integration methods. The general solution of the reduced equation permits to construct a two-parameter family of exact solutions for the KE equation, providing a rich class of new exact solutions that, to the best or our knowledge, have not been reported before.

Keywords