

Symbolic Computation and Construction of Soliton-like Solutions of some Nonlinear Evolution Equations

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Based on the computerized symbolic computation system *Maple* and a Riccati equation, a new generalized Riccati equation expansion method for constructing non-travelling waves and coefficient functions' soliton-like solutions of nonlinear evolution equations (NEEs) is presented by a general ansatz. Compared with most of the existing tanh methods, namely the extended tanh-function method, the modified extended tanh-function method and the generalized hyperbolic-function method, the proposed method is more powerful. By use of the method one can not only successfully recover the previously known formal solutions but also construct new and more general formal solutions for some NEEs. The cylindrical Korteweg-de Vries (CKdV) equation, a Potential Kadomstev-Petviashvili (PKP) equation, the two-dimensional KdV-Burgers equation are chosen to illustrate our method such that rich new families of exact solutions, including the non-travelling wave soliton-like solutions, singular soliton-like solutions, periodic form solutions are obtained. When taking arbitrary functions of the solutions as some special constants, the known travelling wave solutions of the PKP equation, two-dimensional KdV-Burgers equation can be recovered.

Key words: Generalized Riccati Equation Expansion Method; CKdV Equation; PKP Equation;
Two-dimensional KdV-Burgers Equation; Soliton-like Solutions; Soliton;
Symbolic Computation.