Jacobi Elliptic Function Rational Expansion Method with Symbolic Computation to Construct New Doubly-periodic Solutions of Nonlinear Evolution Equations

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A new Jacobi elliptic function rational expansion method is presented by means of a new general ansatz and is very powerful, with aid of symbolic computation, to uniformly construct more new exact doubly-periodic solutions in terms of rational form Jacobi elliptic function of nonlinear evolution equations (NLEEs). We choose a (2+1)-dimensional dispersive long wave equation to illustrate the method. As a result, we obtain the solutions found by most existing Jacobi elliptic function expansion methods and find other new and more general solutions at the same time. When the modulus of the Jacobi elliptic functions m → 1 or 0, the corresponding solitary wave solutions and trigonometric function (singly periodic) solutions are also found.

Key words: (2+1)-dimensional Dispersive Long Wave Equation; Jacobi Elliptic Functions; Travelling Wave Solution; Soliton Solution; Periodic Solution.