TRAVELING WAVE SOLUTIONS OF THE (2 + 1)-DIMENSIONAL NONLINEAR SCHRÖDINGER EQUATION WITH CRITICAL EXPONENT
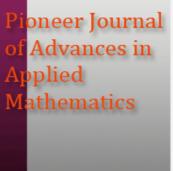
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Abstract

In this paper, we mainly use the bifurcation method of dynamical systems to solve $(2 + 1)$-dimensional nonlinear Schrödinger equation with critical exponent. It is obtained that a series of traveling wave solutions represented by Jacobi elliptic function which including solitary wave solutions, periodic wave solutions, kink wave solutions and anti-kink wave solutions. First, the original equation is transformed into ordinary differential equations nonlinear dynamical systems. Then, we get the singular points of the system, and divide the different parameter space to analyze the type of the singular points. The first integral is used to solve the Hamiltonian, and the phase portraits is drawn, which used to study the topology of the singular points in the neighborhood of the orbits. Finally, we deal with the equation, the solutions of the equation are solved and the 3-dimensional figures are drawn with the help of Maple software, which clearly describe the solutions of the waveform.