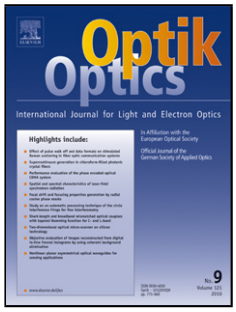

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Bifurcations of solitary wave solutions for the three dimensional Zakharov-Kuznetsov-Burgers equation and Boussinesq equation with dual dispersion

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Abstract

In this research, twe apply a new technique for solving and obtaining exact and solitary wave solutions of the three dimensional Zakharov-Kuznetsov-Burgers equation for the dust-ion-acoustic waves in dusty plasmas and Boussinesq equation with dual dispersion. We use the improved $\left(\frac{G'}{G}\right)$ −expansion method with the aid of Maple 16 which support us with three different kinds of solutions (the hyperbolic functions, the trigonometric functions and the rational functions). This method depends on auxiliary equation and also it is considered as one of general method for solving partial differential equations where this method include the extended $\left(\frac{G'}{G}\right)$ −expansion method when $\sigma = 0$ and also the $\left(\frac{G'}{G}\right)$ −expansion method when N takes only positive value and zero. All of these solutions helps us to investigate the the physical meaning of each models and the stability of above mentioned model.

Keywords

The three dimensional Zakharov-Kuznetsov-Burgers equation; Boussinesq equation with dual dispersion; The improved $\left(\frac{G'}{G}\right)$- expansion method; Traveling wave solutions; Solitary wave solutions.

1. Introduction

At the end of the eighteenth century and exactly when Zabusky & Kruskal introduced the mean of soliton and how can many models in different fields can be expressed as nonlinear partial differential equations (NLPDEs.) or even nonlinear partial differential equations system (NLPDES.), Many researchers in that field raced to discover and apply some new technique to obtain exact and solitary wave solutions for these models for example (The $\left(\frac{G'}{G}\right)$-expansion method, the $exp\left(-i\,\phi(\xi)\right)$-expansion method, the extended tanh-function method,