Application of Extended Fan Sub-Equation Method to Generalized Zakharov Equation

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Abstract: In this paper, the extended Fan sub-equation method is applied to obtain exact solutions of the generalized Zakharov equation. Applying this method, we obtain various solutions which are benefit to further understand the concepts of the complicated nonlinear physical phenomena. This method is straightforward, and it can be applied to many nonlinear equations. In this work, we use Mathematica for computations and programming.

1 Introduction

Nonlinear partial differential equations (PDEs) appear in many fields, such as fluid mechanics, solid state physics, plasma physics, chemical physics, nonlinear optics , and so on. Thus, nonlinear PDEs play an important role in the study of nonlinear science, especially in the study of nonlinear physical science. Exact solutions of nonlinear PDEs can provide much physical information to understand the mechanism that governs these physical models or provide better knowledge of the physical problems and possible applications [2]. For example, the wave phenomena observed in fluid dynamics, plasma and elastic media are often modeled by the bell-shaped sech solutions and the kink-shaped tanh solutions. Therefore, finding exact solutions of nonlinear PDEs has been of great significance. In the past decades, many researchers have paid more attention to various powerful methods for obtaining exact solutions to nonlinear PDEs. Some of the most

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