The Homotopy Perturbation Method and the Variational Iteration Method to Nonlinear Differential Equat

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Abstract: Obtaining exact and approximate solutions of the nonlinear differential equations is an important and active area of research in the field of mathematical sciences. Semi-analytical methods such as the Homotopy Perturbation Method (HPM) and the Variational Iteration Method (VIM) are effective and powerful algorithms in order to obtain exact solutions of the equations.

Keywords: Homotopy Perturbation Method, Variational Iteration Method, Nonlinear differential equations

1. Introduction

Semi-analytical methods such as the Variational Iteration Method (VIM) and Homotopy Perturbation Method (HPM) are introduced by He [1,2] to obtain exact solutions of the nonlinear differential equations. Then, application of the HPM in solving the non-linear non-homogeneous partial differential equations is presented by He [3]. In order to solve autonomous ordinary differential equation and delay differential equation, the VIM is applied by He [4,5].
2. Applications

Nourazar et al. [6] obtained the exact solution of Newell-Whitehead-Segel equation by using the homotopy perturbation method. The exact solution of Burgers-Huxley equation is obtained by Nourazar et al. [7] using the homotopy perturbation method. In order to present exact Solution of Fitzhugh–Nagumo equation, the homotopy perturbation method is used by Nourazar et al. [8]. Also, Soori et al. [9] presented application of the variational iteration method and the homotopy perturbation method to the Fisher type equation.

References


