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Summary: In the present study, a new amendment in Laplace variational iteration method for the solution of fourth-order parabolic partial differential equations with variable coefficients is revealed i.e., modified Laplace variational iteration method (ML-VIM). The proposed modification is made by coupling of two methods: one of them is variational iteration method (VIM) and the other one is Laplace transformation (LT). Our modification has an important beauty that one has no need to compute Lagrange multiplier via integration nor by taking convolution theorem and has a simple way to use in the implementation of our proposed scheme. Moreover, homotopy perturbation method (HPM) with He’s polynomials is employed for the computation of nonlinear terms. The main improvement of our proposed scheme is the reduction of the problem to a simple one, which also embraces for solving a nonlinear term. Some illustrated examples are interpreted which unveil the robustness and accuracy of the newly developed scheme.

MSC: 65M80 Fundamental solutions, Green’s function methods, etc. for initial value and initial-boundary value problems involving PDEs

Keywords: modified Laplace variational iteration method; homotopy perturbation method; Lagrange multipliers; fourth order parabolic PDEs

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