Comparing the Adomian method and Adomian-Duan-Rach method for the solutions of a fourth-order nonlinear differential equation with four specified boundary values

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Abstract

In this paper, a fourth-order nonlinear differential equation with four specified boundary values is solved by the modified Adomian-Duan-Rach decomposition method. This modification also avoids solving a sequence of nonlinear algebraic equations for the undetermined coefficients fraught with multiple roots, thus more rapid rate of convergence observed for the Adomian decomposition series. In this method, all of the boundary values utilized before determining the Adomian polynomials. Example presented in this study showed that this method can be accelerated the convergence of the Adomian series with high accuracy for solving boundary value problems for higher order nonlinear differential equations.

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