Approximate Analytical Solution of a Nonlinear Boundary Value Problem and its Application in Fluid Mechanics

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Although the decomposition method and its modified form were used during the last two decades by many authors to investigate various scientific models, a little attention was devoted for their applications in the field of fluid mechanics. In this paper, the Adomian decomposition method (ADM) is implemented for solving the nonlinear partial differential equation (PDE) describing the peristaltic flow of a power-law fluid in a circular cylindrical tube under the effect of a magnetic field. The numerical solutions obtained in this paper show the effectiveness of Adomian's method over the perturbation technique.

Key words: Adomian Decomposition Method; Power-Law Fluid.