A Numerical Solution of Troesch’s Problem via Optimal Homotopy Asymptotic Method

Abstract

Troesch’s problem arose while the investigation of the confinement of a plasma column by applying radiation pressure was being conducted. It is an unstable problem in itself, with a two-point boundary value. The application of the Optimal Homotopy Asymptotic Method (OHAM) is used to attain an approximate solution for the nonlinear differential equation which provides and apt description of Troesch’s problem. Opposing the other reported results, through the variational iteration method, Laplace Transform Decomposition Method, Homotopy Analysis Method, and the Homotopy Perturbation Method, the accuracy of the current solution is commendable for a remarkably wide range of values of Troesch’s parameter. A conducted error analysis clearly admits the efficiency of OHAM.

References


Index Terms

Computer Science Algorithms

Keywords

Troesch’s Problem; Optimal Homotopy Asymptotic Method; Troesch’s Parameter; Highest Degree of Accuracy