
The approximate solutions of linear Goursat Problems via Homotopy Analysis Method

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Abstract

In this study we investigate the linear Goursat problems that arise in linear partial differential equations with mixed derivatives. The standart form of Goursat Problem is given by

$$\begin{aligned}u_{xt} &= f(x, t, u, u_x, u_t), & 0 \leq x \leq a, & 0 \leq t \leq b, \\u(x, 0) &= g(x), & u(0, t) &= h(t), \\u(0, 0) &= g(0) = h(0).\end{aligned}$$

The aim of this work is to present an efficient numerical procedure, namely Homotopy Analysis Method, for solving homogeneous and inhomogeneous linear Goursat problems. The reliability and efficiency of the proposed method are demonstrated by some numerical examples and performed on the computer algebraic system Mathematica 7.

References

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