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Cubic Trigonometric B-Spline Approach to Numerical Solution of Wave Equation

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Abstract : The generalized wave equation models various problems in sciences and engineering. In this paper, a new three-time level implicit approach based on cubic trigonometric B-spline for the approximate solution of wave equation is developed. The usual finite difference approach is used to discretize the time derivative while cubic trigonometric B-spline is applied as an interpolating function in the space dimension. Von Neumann stability analysis is used to analyze the proposed method. Two problems are discussed to exhibit the feasibility and capability of the method. The absolute errors and maximum error are computed to assess the performance of the proposed method. The results were found to be in good agreement with known solutions and with existing schemes in literature.

Keywords : collocation method, cubic trigonometric B-spline, finite difference, wave equation
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