Solution of the Second Order of the Linear Hyperbolic Equation Using Cubic B-Spline Collocation Numerical Method

Title	Solution of the Second Order of the Linear Hyperbolic Equation Using Cubic B-Spline Collocation Numerical Method
Author Order	3 of 3
Accreditation	2
Abstract	Wave equation is one of the second order of the linear hyperbolic equation. Telegraph equation as a special case of wave equation has interesting point to investigate in the numerical point of view. In this paper, we consider the numerical methods for one dimensional telegraph equation by using cubic B-spline collocation method. Collocation method is one method to solve the partial differential equation model problem. Cubic spline interpolation is an interpolation to a third order polynomial. This polynomial interpolate four point. B-Spline is one of spline function which related to smoothness of the partition. For every spline function with given order can be written as linear combination of those B-spline. As we known that the result of the numerical technique has difference with the exact result which we called as, so that we have an error. The numerical results are compared with the interpolating scaling function method which investigated by Lakestani and Saray in 2010. This numerical methods compared to exact solution by using RMSE (root mean square error), L2 norm error and L_Ã¢ÂˆÂž norm error . The error of the solution showed that with the certain function, the cubic collocation of numerical method can be used as an alternative methods to find the solution of the linear hyperbolic of the PDE. The advantages of this study, we can choose the best model of the numerical method for solving the hyperbolic type of PDE. This cubic B-spline collocation method is more efficiently if the error is relatively small and closes to zero. This accuration verified by test of example 1 and example 2 which applied to the model problem.
Publisher Name	Universitas Muhammadiyah Mataram
Publish Date	2022-04-12
Publish Year	2022
Doi	DOI: 10.31764/jtam.v6i2.7496
Citation	
Source	JTAM (Jurnal Teori dan Aplikasi Matematika)
Source Issue	Vol 6, No 2 (2022): April
Source Page	438-447
Url	http://journal.ummat.ac.id/index.php/jtam/article/view/7496/pdf
Author	Dr NUNUNG NURHAYATI, S.Si, M.Si