

Discontinuous Galerkin Method for Higher-Order Ordinary Differential Equations

Authors : Helmi Temimi

Abstract : In this paper, we study the super-convergence properties of the discontinuous Galerkin (DG) method applied to one-dimensional m th-order ordinary differential equations without introducing auxiliary variables. We found that n th-derivative of the DG solution exhibits an optimal $O(h^{p+1-n})$ convergence rates in the L_2 -norm when p -degree piecewise polynomials with $p \geq 1$ are used. We further found that the odd-derivatives and the even derivatives are super convergent, respectively, at the upwind and downwind endpoints.

Keywords : discontinuous, galerkin, superconvergence, higherorder, error, estimates

Conference Title : ICAMCM 2015 : International Conference on Applied Mathematics and Computational Mechanics

Conference Location : London, United Kingdom

Conference Dates : April 24-25, 2015