

A Review on Higher-Order Spline Techniques for Solving Burgers Equation Using B-Spline Methods and Variation of B-Spline Techniques

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Abstract : This is a summary of articles based on higher order B-splines methods and the variation of B-spline methods such as Quadratic B-spline Finite Elements Method, Exponential Cubic B-Spline Method, Septic B-spline Technique, Quintic B-spline Galerkin Method, and B-spline Galerkin Method based on the Quadratic B-spline Galerkin method (QBGM) and Cubic B-spline Galerkin method (CBGM). In this paper, we study the B-spline methods and variations of B-spline techniques to find a numerical solution to the Burgers' equation. A set of fundamental definitions, including Burgers equation, spline functions, and B-spline functions, are provided. For each method, the main technique is discussed as well as the discretization and stability analysis. A summary of the numerical results is provided, and the efficiency of each method presented is discussed. A general conclusion is provided where we look at a comparison between the computational results of all the presented schemes. We describe the effectiveness and advantages of these methods.

Keywords : Burgers' equation, Septic B-spline, modified cubic B-spline differential quadrature method, exponential cubic B-spline technique, B-spline Galerkin method, quintic B-spline Galerkin method

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