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Numerical Solution of the Coupled Viscous Burgers' Equation via Cubic Trigonometric B-spline Approach

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Abstract. This paper presents a new approach and methodology to solve one dimensional coupled viscous Burgers' equation with Dirichlet boundary conditions using cubic trigonometric B-spline collocation method. The usual finite difference scheme is applied to discretize the time derivative. Cubic Trigonometric B-spline basis functions are used as an interpolating function in the space dimension. The scheme is shown to be unconditionally stable using the von Neumann (Fourier) method. Two test problems are presented to confirm the accuracy of the new scheme and to show the performance of

trigonometric basis functions. The numerical results are found to be in good agreement with known exact solutions and also with earlier studies.

Keywords: One dimensional coupled viscous Burgers' equation; Cubic trigonometric B-spline basis functions; Cubic trigonometric B-spline collocation method; Stability.