Local Meshless Method for the Numerical Solution of the Two-Dimensional Nonlinear Burger's Equations

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Abstract

This paper examines the numerical solution of the nonlinear coupled Burger's equations with various values of viscosity by local meshless methods. The local radial basis functions collocation method (LRBFCM) belongs to the class of truly meshless methods which do not need any underlying mesh but work on a set of uniform or random nodes only, without any a priori node to node connectivity. The numerical solution obtained from the LRBFCM for different value of viscosity parameter are compared with analytical solution as well as other numerical methods. Time discretization is performed in explicit way and collocatio with the multiquadric radial basis functions (RBFs) are used to interpolate diffusion-convection variable and its spatial derivatives. Five nodded sub-domains are used in the local support. Accuracy of the method is assessed as a function of the time and space discretizations. It can be easily seen that the proposed method is efficient, accurate and stable for high Reynolds numbers.