

Meshfree Strong-Weak form (MSW) method and its application to incompressible flow problems

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Abstract

In this paper, a new meshfree method based on the mixed strong-weak form governing equations is proposed. In this method, the meshfree collocation method for strong form equations is applied to the internal nodes and the nodes on the essential boundaries; the meshfree local Petrov-Galerkin method for weak form equations is applied to the nodes on the natural boundaries. This method is then adopted to simulate natural convection in enclosed domains with different geometries and different nodal distributions. It is demonstrated in this paper that the present method has good efficiency without trading in the accuracy.

Keyword: Meshfree method, MSW, Radial basis functions, Vorticity-stream function, Incompressible flow, Natural convection