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عنوان مقاله:

Numerical solution of unsteady incompressible nanofluid flow with mixed convection heat transfer using Jameson method on unstructured grid

محل انتشار:

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نویسندگان:

Sajjad Rasoolzadeh - Department of Mechanical Engineering, Azerbaijan Shahid Madani University, Tabriz, ۵۳۷۵۱-۷۱۳۷۹, Iran

Mir Yoseph Hashemi - Department of Mechanical Engineering, Azerbaijan Shahid Madani University, Tabriz, ۵۳۷۵۱-۷۱۳۷۹, Iran

خلاصه مقاله:

The purpose of this paper is to numerically simulate unsteady, incompressible and laminar flow with natural and mixed convection heat transfer in a square lid-driven cavity filled with Cu-Water nanofluid. Jameson method is used in conjunction with Artificial compressibility method on unstructured grid in a viscous flow. Effects of Grashof number and nanoparticle volume fraction on the flow and heat transfer characteristics are investigated. Two dimensional Navier-Stokes equations as the governing equations of the problem are discretized with finite volume method. Spatial discretization is performed with two order central scheme and Jameson artificial dissipation terms are added to equations to stabilize the solution. Unsteady terms are discretized with implicit two order scheme and are solved with fourth order explicit Runge-Kutta method in pseudo-time. It is found that Jameson method has good performance with reasonable convergence rate. Results show that increase in volume fraction of nanoparticles improves heat transfer characteristics while increase in Grashof number, weakens the heat transfer due to domination of natural convection.

کلمات کلیدی:

Unsteady numerical simulation, Jameson method, Cu-water nanofluid, Artificial compressibility, Mixed convection heat transfer

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