عنوان مقاله:

A Novel Multidimensional Characteristic Modeling of Incompressible Convective Heat Transfer

محل انتشار:

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خلاصه مقاله:

A characteristic-based approach is developed for thermo-flow with finite volume methodology (FVM) in which multidimensional characteristic (MC) scheme is applied for convective fluxes. Artificial compressibility (AC) is used, and as a result governing equations take the hyperbolic nature. To obtain compatibility equations and pseudo characteristics, energy equation is taken into account in the MC scheme. With MC scheme for convective fluxes, no artificial viscosity is required even at high Reynolds numbers. As benchmarks, forced convection between parallel plates and forced and mixed convection in a cavity are examined for a wide range of Reynolds, Grashof and Prandtl numbers. First-order MC and second-order averaging schemes are used for simulate them. Results show the better performance of MC scheme in force convection as well as mixed convection. Results confirm the robustness of MC scheme in terms of accuracy and convergence, and are in good agreement with the standard benchmark solutions in .the literature

کلمات کلیدی:

Multidimensional characteristics, Navier, stokes equations, Artificial compressibility, Mixed convection, Finite volume method