عنوان مقاله:

Simulation of natural convection in eccentric annulus: A combined Lattice Boltzmann and Smoothed profile approach

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خلاصه مقاله:

In this paper a combination of lattice Boltzmann methodand smoothed profile method is applied to simulate naturalconvection heat transfer in horizontal eccentric annuals. Inthis approach, the fluid-solid interface has a thickness whichis comparable to grid spacing and it varies continuouslyfrom zero in fluid region to one in solid region. A twodimensional double distribution function lattice Boltzmannmethod is employed to simulate fluid flow and temperatureprofiles simultaneously. In order to implement the velocityand temperature boundary conditions, the force term andheat source/sink are included in the evolution equations.Since SPM employs fixed Eulerian nodes to implement allcalculations, the computational efficiency is improvedgreatly. The influence of vertical, horizontal and diagonaleccentricities at various positions is investigated. Isotherms,Streamlines and Nusselt numbers are given for each case.

کلمات کلیدی:

Lattice Boltzmann method, Natural convection,Eccentricities, Smoothed profile method

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