

Documents

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Natural convection analysis in a square enclosure with a wavy circular heater under magnetic field and nanoparticles

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Abstract

The aim of the current study is to investigate the natural convection heat transfer in a square enclosure with a wavy circular heater under magnetic field and nanoparticles. The governing equations that are expressed in dimensionless form are solved by means of control volume finite element method employing a validated FORTRAN code. The dimensionless controlling parameters of the present investigation are shape factor of nanoparticles (m), Hartmann number (Ha), Rayleigh number (Ra), and nanoparticle volume fraction (ϕ). In this study, the amplitude A and number of undulations N are fixed at a constant value of 0.2 and 8, respectively. The obtained results portray that in the presence of waves on the inner wall of the annulus, the heat transfer rate is an ascending function of Rayleigh number, nanoparticle volume fraction and less obvious function of their shape factor, while it is a descending function of the Hartmann number. © 2019, Akadémiai Kiadó, Budapest, Hungary.

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