Scopus

Documents

Ismael, M.A., Selimefendigil, F., Chamkha, A.J.

Mixed convection in a vertically layered fluid-porous medium enclosure with two inner rotating cylinders
(2017) *Journal of Porous Media*, 20 (6), pp. 491-511. Cited 4 times.

Abstract
In this study, mixed convection in a vertically half partitioned cavity with two rotating adiabatic cylinders is numerically investigated. The horizontal walls are thermally insulated. The left vertical wall is kept isothermally at high temperature while the right vertical wall is kept isothermally at lower temperature. The Galerkin weighted residual finite element method is used to solve the governing equations. The numerical study is performed for various values of Rayleigh numbers (between 103 and 106), angular rotational speed of the cylinders (between -5000 and 5000), Darcy numbers (between 10-5 and 10-2), horizontal positions of the cylinder centers (between 0.4 and 0.6) and cylinder sizes (between 0.1 and 0.4). It is observed that angular velocity of the cylinders and cylinder sizes have a profound effect on the heat transfer enhancement along the hot vertical wall. The averaged heat transfer enhancements are 354.65% and 45.24% at a Rayleigh number of 106 compared to the case at a Rayleigh number of 103 for cylinder sizes of R = 0.1 and R = 0.4. Large variations in the local heat transfer are seen for various angular velocities of the cylinder, and cylinder rotation brings averaged heat transfer enhancement for sizes of R = 0.3 and R = 0.4. The averaged heat transfer enhances by 235.10% for a Darcy number of 10-2 compared to a Darcy number of 10-5 using cylinder sizes of R = 0.1. The horizontal movement of the cylinder centers increases the averaged heat transfer by 34.08% for (D1 = D2 = 0.6) compared to configuration at (D1 = D2 = 0.4) for angular rotational speed of Ω = -5000. © 2017 by Begell House, Inc.

2-s2.0-85023184721
Document Type: Article
Publication Stage: Final
Source: Scopus