Abstract

Two-dimensional unsteady mixed convection in a porous cavity with heated bottom wall is numerically studied in the present paper. The forced flow conditions are imposed by providing a hydrostatic pressure head at the inlet port that is located at the bottom of one of the vertical side walls and an open vent at the top of the other vertical side wall. The Darcy model is adopted to model the fluid flow in the porous medium and the combination effects of hydrostatic pressure head and the heat flux quantity parameters are carefully investigated. These governing parameters are varied over wide ranges and their effect on the heat transfer characteristics is studied in detail. It is found that the time required to reach a desired temperature at the bottom wall decreases with heat flux and pressure head increase. The higher heat flux quantities leaves wider regions near the top wall at lower temperatures which is important in most engineering applications like drying.

References

Mixed Convection in a Square Cavity Filled with Porous Medium with Heated Bottom Wall

Mixed Convection in a Square Cavity Filled with Porous Medium with Heated Bottom Wall


Index Terms

Computer Science
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Keywords

Porous Medium  Mixed Convection  Square Cavity  Uniform Heating  Finite Volume Method