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Soret and dufour effects on mhd natural convective heat and solute transfer in a fluid-saturated porous cavity
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Abstract

The present problem addresses double-diffusive magnetohydrodynamic free convection in an inclined square cavity filled with a fluid-saturated porous medium under the influence of Soret and Dufour effects. The inclined cavity makes an angle with the horizontal plane. A uniform magnetic field inclined with the same angle of inclination of the cavity is applied. At the two horizontal walls of the cavity, the heat and solute transverse gradients are applied, and lateral walls of the cavity are regarded as insulated and impermeable. Using the appropriate dimensionless quantities, the governing equations with boundary conditions are transformed to nondimensional form. The governing partial differential equations are solved by the finite element method of Galerkin's weighted residual scheme. Numerical results are obtained for different values of the Rayleigh number, Lewis number, buoyancy ratio, magnetic field parameter, Soret number, and Dufour number. The overall investigation of variation of streamlines, isotherms, isoconcentration, Nusselt number, and Sherwood number is presented graphically. © 2016 by Begell House, Inc.

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