INFLUENCE OF PROPERTY VARIATION ON NATURAL CONVECTION IN A CUBIC BOX FILLED WITH HEAT GENERATING POROUS MEDIUM

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ABSTRACT The present numerical study investigates influence of property variation on three-dimensional natural convection in a cubic box filled with gas saturated heat generating porous medium. All walls of the box are maintained at constant temperature. Gas density variation follows ideal gas equation whereas variation of viscosity and conductivity follows power law. Governing equations consisting of continuity equation, momentum equation based on Darcy law and energy equation have been solved using successive accelerated replacement scheme. The maximum temperature in the box increases for all property variation compared to Boussinesq approximation. The maximum temperature increases for density and viscosity variation and decreases for conductivity variation. The effect of property variation is more pronounced at higher heat generation.