Non-Darcy Effects on Steady Three-Dimensional Natural Convection in a Rectangular Box Containing Heat Generating Porous Medium

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ABSTRACT The present numerical study reports results of three-dimensional natural convection in a rectangular box filled with fluid saturated heat generating porous medium. Brinkman extended Darcy flow model is considered in this study. The model has been numerically simulated employing Successive Accelerated Replacement scheme for wide range of parameters i.e. $100 \leq Ra \leq 1000$, $0.00001 \leq Da \leq 0.1$, $0.1 \leq A_y \leq 10$ and $0.1 \leq A_z \leq 10$. As Darcy number increases, maximum temperature increases and position of maximum temperature shifts downwards towards center. The effect of varying the Darcy number is more pronounced at higher Rayleigh number and higher aspect ratios.