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NATURAL CONVECTION IN A SQUARE POROUS CAVITY WITH LINEARLY HEATED SIDE WALL USING A THERMAL NONEQUILIBRIUM MODEL

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ABSTRACT. Results of a numerical analysis of two-dimensional steady natural convection in a square cavity filled with porous medium by adopting a two-temperature model of heat transfer are presented. The left wall is linearly heated (Increasing wall temperature or decreasing wall temperature), the right wall is uniformly cooled while the horizontal walls are considered insulated. A well-developed program (based on the finite volume method and the SIMPLE algorithm) was utilized to numerically solve the governing Navier-Stokes equations with the associated boundary conditions. The controlling parameters on the fluid flow and heat transfer for this investigation are the inter-phase heat transfer coefficient (H), the porosity-scaled conductivity ratio (γ), the Rayleigh number (Ra) and the Darcy number (Da) at Pr = 0.71.