Study of Mixed Convection in a Vertical Channel Filled with a Reactive Porous Medium in the Absence of Local Thermal Equilibrium

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Abstract : This work consists of a numerical simulation of convective heat transfer in a vertical plane channel filled with a heat generating porous medium, in the absence of local thermal equilibrium. The walls are maintained to a constant temperature and the inlet velocity is uniform. The dynamic range is described by the Darcy-Brinkman model and the thermal field by two energy equations model. A dimensionless formulation is developed for performing a parametric study based on certain dimensionless groups such as, the Biot interstitial number, the thermal conductivity ratio and the volumetric heat generation. The governing equations are solved using the finite volume method, gave rise to a multitude of results concerning in particular the thermal field in the porous channel and the existence or not of the local thermal equilibrium.