COMBINED HEAT AND MASS TRANSFER ON NON-DARCY NATURAL CONVECTION IN A FLUID SATURATED POROUS MEDIUM WITH THERMOPHORESIS

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The present investigation deals with the combined heat and mass transfer with the effects of thermal dispersion, radiation on non-Darcy natural convection in a fluid saturated porous medium with thermophoresis. The governing equations, reduced to local similarity boundary layer equations using suitable transformations are obtained. Forchheimer extension is considered in the flow equations. The coefficient of thermal diffusivity has been assumed to be the sum of molecular diffusivity and the dispersion thermal diffusivity due to mechanical dispersion. Rosseland approximation is used to describe the radiative heat flux in the energy equation. For the fluids having the Lewis number Le=*1.0*, *10.0*, numerical values of the local Stanton number are presented in a tabular form for different values of the thermophoretic parameter τ, thermal dispersion and thermal radiation for the two cases of Darcy and non-Darcy porous medium. The concentration distributions are shown graphically for various values of the thermophoretic parameter, thermal dispersion and thermal radiation.

Key words: heat and mass transfer, thermophoresis, radiation, thermal dispersion, natural convection.

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