Double Diffusive Natural Convection in Horizontal Elliptical Annulus Containing a Fluid-Saturated Porous Medium: Effects of Lewis Number

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Abstract : Two-dimensional double diffusive natural convection in an annular elliptical space filled with fluid-saturated porous medium, is analyzed by solving numerically the mass balance, momentum, energy and concentration equations, using Darcy's law and Boussinesq approximation. Both walls delimiting the annular space are maintained at two uniform different temperatures and concentrations. The external parameter considered is the Lewis number. For the present work, the heat and mass transfer for natural convection is studied for the case of aiding buoyancies, where the flow is generated in a cooperative mode by both temperature and solutal gradients. The local Nusselt and Sherwood numbers are presented in term of the external parameter.

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Keywords : double diffusive, natural convection, porous media, elliptical annulus

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