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Influence of Internal Heat Source on Thermal Instability in a Horizontal Porous Layer with Mass Flow and Inclined Temperature Gradient

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Abstract : An investigation has been presented to analyze the effect of internal heat source on the onset of Hadley-Prats flow in a horizontal fluid saturated porous medium. We examine a better understanding of the combined influence of the heat source and mass flow effect by using linear stability analysis. The resultant eigenvalue problem is solved by using shooting and Runga-Kutta methods for evaluate critical thermal Rayleight number with respect to various flow governing parameters. It is identified that the flow is switch from stabilizing to destabilizing as the horizontal thermal Rayleigh number is enhanced. The heat source and mass flow increases resulting a stronger destabilizing effect.

Keywords : linear stability analysis, heat source, porous medium, mass flow
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