ON GILL'S STABILITY PROBLEM WITH INTERNAL HEATING

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ABSTRACT The buoyant flow in a vertical porous layer with open boundaries at uniform unequal temperatures is analysed. The effects of a uniform volumetric heat source are taken into account. The basic parallel flow solution is proved to be unstable when either the temperature difference between the boundaries or the intensity of the volumetric heat source are sufficiently large. The linear instability is investigated through a modal analysis. The stability eigenvalue problem is solved numerically by employing the shooting method. The neutral stability curves are obtained and the critical parameters at onset of instability are determined.