عنوان مقاله:

The onset of Casson fluid convection in a permeable medium layer produced by purely inner heating with magnetic field

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خلاصه مقاله:

In this inspection, the control of the magnetic power on the onset of Casson fluid convection formed by purely inner warming in a porous medium layer is examined. The modified Darcy model is employed to designate the rheological arrival of Casson liquid flow in a porous matrix. Two types of thermal boundaries are exploited, namely, type (I) both isothermal and type (II) lower insulated and top isothermal boundaries. Using the linear stability inspection and Galerkin technique, the approximate analytical solution and numerical solution correct to one decimal place are offered. It is detected that for type (I) boundary conditions, the convective wave concentrates in the upper layer if it occurs, whereas for type (II) boundary conditions, it emphases in the whole layer. The magnetic Chandrasekhar number postpones the convection movement while the Casson constraint accelerates it. The facet of the convective cells drops with enhancing the magnetic strength and the Casson constraint. In the absenteeism of magnetic field, the Casson constraint has no regulation on the dimension of convective cells. It is also found that the presented analytical result with two term Galerkin process has overall ۵% error, while with one term Galerkin process the error was overall ۱۹%.

کلمات کلیدی:

Casson Fluid, Convective motion, magnetic field, Porous medium, Internal Rayleigh number

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