عنوان مقاله:

Oscillatory Magnetohydrodynamic Natural Convection of Liquid Metal between Vertical Coaxial Cylinders

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خلاصه مقاله:

A numerical study of oscillatory magnetohydrodynamic (MHD) natural convection of liquid metal between vertical coaxial cylinders is carried out. The motivation of this study is to determine the value of the critical Rayleigh number, Racr for two orientations of the magnetic field and different values of the Hartmann number (Harand Haz) and aspect ratios A. The inner and outer cylinders are maintained at uniform temperatures, while the horizontal top and bottom walls are thermally insulated. The governing equations are numerically solved using a finite volume method. Comparisons with previous results were performed and found to be in excellent agreement. The numerical results for various governing parameters of the problem are discussed in terms of streamlines, isotherms and Nusselt number in the annuli. The time evolution of velocity, temperature, streamlines and Nusselt number with Racr, Har, Haz, and A is quite interesting. We can control the flow stability and heat transfer rate in varying the aspect ratio, intensity and direction of the magnetic field.

کلمات کلیدی:

MHD, Numerical modeling, Liquid metal, Natural convection, Hydrodynamic stability, Cylindrical annulus

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