

Article Abstract

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| Title: | Unsteady hydromagnetic Couette flow within a porous channel with Hall effects |
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| Abstract: | Unsteady hydromagnetic Couette flow of a viscous, incompressible and electrically conducting fluid between two infinitely long parallel porous plates, taking Hall current into account, in the presence of a transverse magnetic field is studied. Fluid flow within the channel is induced due to impulsive movement of the lower plate of the channel. Magnetic lines of force are assumed to be fixed relative to the moving plate. Solution of the governing equations is obtained by Laplace transform technique. The expression for the shear stress at the moving plate due to primary and secondary flows is also derived. Asymptotic behavior of the solution valid for small and large values of time t is analyzed to gain some physical insight into the flow pattern. Numerical values of the primary and secondary velocities are displayed graphically versus non-dimensional channel width variable η for various values of Hall current parameter m , magnetic parameter M^2 , suction/injection parameter S and time t whereas the numerical values of shear stress at the moving plate due to primary and secondary flows are presented in tabular form for different values of m , M^2 , S and t . |
| Keywords: | Hydromagnetic Couette flow, suction/injection, magnetic field, impulsive movement of the plate, modified Hartmann boundary layer. |