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ON HYDROMAGNETIC CHANNEL FLOW OF A TWO-PHASE FLUID INDUCED BY SQUARE PULSES S

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Abstract

An initial value problem is solved for the unsteady motion of an incompressible conducting viscous fluid with embedded small spherical inert particles between two transversely to the plates. The flow is generated from rest in the fluid-particle system when the upper plate is subjected to discontinuous square pulses to move in its own plane with the lower plate held fixed. It is assumed that no external electric field is imposed on the fluid-particle system and the magnetic Reynolds number is very small. Exact solution of the problem is obtained by the method of Fourier analysis. The inquiries are made about the fluid and the particle velocities and the skin-frictions at the walls. The results are investigated numerically with graphical presentations.The simultaneous effects of the particles and the magnetic field on the flow and the skin-frictions are discussed. Finally, the solution for the fluid velocity derived by the present method has been converted to that obtained by the usual method of Laplace transforms which confirms that both the methods give the same exact solution of the problem.

Key Words : *Hydromagnetic, pulsatile flow, two-phase fluid*