

## عنوان مقاله:

A Magnetohydrodynamic Time Dependent Model of Immiscible Newtonian and Micropolar Fluids through a Porous Channel: a Numerical Approach

## محل انتشار:

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## خلاصه مقاله:

The objective of the present article is to study the magnetohydrodynamic(MHD) unsteady flow and heat transfer of two immiscible micropolar and Newtonian fluids through horizontal channel occupied with porous medium. Initially, fluids in both regions as well as both plates are at rest. At an instant of time, the flow in both regions is generated by a constant pressure gradient. The governing non-linear and coupled partial differential equations of Eringen's micropolar fluid and Newtonian fluid are solved subject to suitable initial, boundary and interface conditions. The numerical results for velocity, microrotation and temperature are obtained using Crank-Nicolson finite difference approach. The results obtained for velocities, microrotation and temperatures are presented through figures. The analysis regarding volume flow rate, skin-friction co-efficient and Nusselt number is also done and is presented through tables. It is explored that, velocity, microrotation and temperature are increasing with time and accomplishing steady state at higher time level. Velocity is decreasing with micropolarity parameter and Hartmann number, and increasing with Darcy number. Temperature enhances with increasing Brinkmann number, and declines with Prandtl number and ratio of thermal conductivities.

## کلمات کلیدی:

Immiscible fluid, Micropolar fluid, Unsteady flow, MHD flow, Heat transfer, Porous medium

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