

On a Transient Magnetohydrodynamics Heat Transfer Within Radiative Porous Channel Due to Convective Boundary Condition

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Abstract : In this paper, the steady/transient MHD heat transfer within radiative porous channel due to convective boundary conditions is considered. The solution of the steady-state and that of the transient version were conveyed by Perturbation and Finite difference methods respectively. The heat transfer mechanism of the present work ascertains the influence of Biot number (B_i), magnetizing parameter (M), radiation parameter (R), temperature difference, suction/injection (S) Grashof number (Gr) and time (t) on velocity (u), temperature (θ), skin friction (τ), and Nusselt number (Nu). The results established were discussed with the help of a line graph. It was found that the velocity, temperature, and skin friction decay with increasing suction/injection and magnetizing parameters while the Nusselt number upsurges with suction/injection at $y = 0$ and falls at $y = 1$. The steady-state solution was in perfect agreement with the transient version for a significant value of time t . It is interesting to report that the Biot number has a cogent influence consequently, as its values upsurge the result of the present work slant the extended literature.

Keywords : heat transfer, thermal radiation, porous channel, MHD, transient, convective boundary condition

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