

THE INFLUENCE OF THERMAL RADIATION, MASS DIFFUSION
AND FRACTIONAL PARAMETERS ON MHD FLOW OVER A
VERTICAL PLATE THAT APPLIES TIME DEPENDENT SHEAR TO
THE FLUID

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Abstract

Exact expressions for velocity field, temperature and mass concentration corresponding to the radiative flow of an MHD viscous fluid over an infinite plate that applies time dependent shear to the fluid have been calculated. These expressions are obtained by using Laplace transform of corresponding fractional differential equations. The expression of temperature and mass concentration of fluid have been presented in series form. However, velocity field is presented in the form of integral solutions. All exact expressions satisfy initial and boundary conditions. Some significant limiting cases of fluid parameters and of fractional parameters have been discussed. The influence of fluid and fractional parameters on fluid motion have been analyzed through graphical illustrations. Two special cases of shear stress; shear stress in the form of Heaviside function and oscillating shear stress have also been taken into account to compare the behavior of fluid motion graphically.

Keywords: MHD viscous fluid, fractional derivatives, thermal radiation, exact solutions

References

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