

## **Unsteady MHD Blasius and Sakiadis flows with variable thermal conductivity in the presence of thermal radiation**

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We consider the unsteady laminar two-phase (Blasius and Sakiadis) flows filed with porous media under the combined effects of Brownian motion and thermophoresis as thermal radiation. Variable thermal conductivity is also considered in this study. The cartesian coordinate has the origin at the leading edge with the  $x$  axis extending along the sheet in the flow direction and the  $y$  axis is measured perpendicular to the flow. The unsteady fluid flow, heat and mass transfer start at time zero and the sheet is being stretched with velocity  $U(x,t)$ , along the  $x$  axis while the origin is kept fixed. The temperature and the concentration fields of the sheet are respectively,  $T_w(x; t)$  and  $C_w(x; t)$  and are summed to be linear functions of  $x$ . The thermo-physical properties of the sheet and the ambient fluid are assumed to be constant except density variations and thermal conductivity which we assume to be linearly vary with temperature. The nonlinear partial differential equations are transformed into a system of nonlinear dimensionless ordinary differential equations using suitable similarity transformations. The resultant nonlinear differential equations are then numerically solved using recently developed numerical methods.

**Keywords:** Unsteady MHD Blasius and Sakiadis flows; variable thermal conductivity; thermal radiation; viscous dissipation.