

## **Effects of Joule heating and viscous dissipation an MHD Marangoni convection boundary layer flow.**

### **ABSTRACT**

An analysis is performed to study the effects of the Joule heating and viscous dissipation on the magnetohydrodynamics (MHD) Marangoni convection boundary layer flow. The governing partial differential equations are reduced to a system of ordinary differential equations via the similarity transformations. Numerical results of the similarity equations are obtained using the Runge-Kutta-Fehlberg method. Effects of the magnetic field parameter, and the combined effects of the Joule heating and the viscous dissipation are investigated and the numerical results are tabulated in tables and figures. It is found that the magnetic field reduces the fluid velocity but increases the fluid temperature. On the other hand, the combined effects of the Joule heating and viscous dissipation have significantly influenced the surface temperature gradient.

**Keyword:** Joule heating; Marangoni convection boundary layer; MHD; Viscous dissipation.