Proceedings of CHT-17
ICHMT International Symposium on Advances in Computational Heat Transfer

May 28-June 1, 2017, Napoli, Italy

CHT-17-xxx

DOUBLE DIFFUSIVE MHD FREE CONVECTIVE FLOW OF WALTER'S LIQUID-B FLUID PAST A NONLINEAR STRETCHING SHEET WITH PARTIAL VELOCITY SLIP

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Abstract: An investigation is carried out for the steady two dimensional double diffusive MHD natural convective flow of an incompressible, electrically conducting and optically thick radiating viscoelastic fluid over a nonlinearly moving extensible sheet with convective thermal boundary condition taking partial velocity slip into account. To get a similar solution of the problem, the governing flow field equations are transformed into one dimensional differential equations with the help of group theoretic transformations. The approximate solution of the transformed equations are obtained using Galerkin finite element method. The developed code of FEM for solving the problem is validated by comparing the results with exact solution of previously published results. Significant findings of the present article are the conjugate effect of partial velocity slip and viscoelasticity of the fluid on Skin friction, Nusselt number, Sherwood number, velocity, temperature and solutal concentration. It is interesting to note that these effect have opposite nature and have tendency to cancel out each other's role on fluid flow characteristics.