World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:11, No:02, 2017

Effects of Thermal Radiation on Mixed Convection in a MHD Nanofluid Flow over a Stretching Sheet Using a Spectral Relaxation Method

Authors : Nageeb A. H. Haroun, Sabyasachi Mondal, Precious Sibanda

Abstract : The effects of thermal radiation, Soret and Dufour parameters on mixed convection and nanofluid flow over a stretching sheet in the presence of a magnetic field are investigated. The flow is subject to temperature dependent viscosity and a chemical reaction parameter. It is assumed that the nanoparticle volume fraction at the wall may be actively controlled. The physical problem is modelled using systems of nonlinear differential equations which have been solved numerically using a spectral relaxation method. In addition to the discussion on heat and mass transfer processes, the velocity, nanoparticles volume fraction profiles as well as the skin friction coefficient are determined for different important physical parameters. A comparison of current findings with previously published results for some special cases of the problem shows an excellent agreement.

Keywords : non-isothermal wedge, thermal radiation, nanofluid, magnetic field, soret and dufour effects
Conference Title : ICMSSC 2017 : International Conference on Mathematics, Statistics and Scientific Computing
Conference Location : Kuala Lumpur, Malaysia
Conference Dates : February 12-13, 2017