Contribution ID: **61** Type: **not specified**

COMBINED EFFECTS OF STEADY VARIABLE VISCOSITY AND THERMAL CONDUCTIVITY ON ELECTRO-OSMOTIC AND MAGNETO-HYDRODYNAMIC FLOWS IN A REACTIVE FLUID

Monday 27 May 2024 17:15 (10 minutes)

Combined effects of steady electro-osmotic flow (EOF) and magneto-hydrodynamics (MHD) with variable viscosity and thermal conductivity of the reactive fluid flow is assumed to vary exponentially with temperature was investigated. The dimensionless variables was used to dimensionalized the governing equations of the flow using suitable physical parameter. However, steady variable viscosity and thermal conductivity momentum and energy coupled nonlinear equations were solved by Weighted Residual (Collocation) method (WRCM) using collocation method to handle the integration.The graphical results was used to study the effects of thermophysical behavior of the model. The influence of electro-osmotic and magnetic field on the fluid flow was significant as Lorentz force retarded the flow while thermal conductivity dampened the fluid flow and viscosity enhanced the temperature field due to the thickness in the thermal boundary layer as the parameter increased.

This paper concluded that variable viscosity and thermal conductivity showed an increase in the velocity and temperature profiles for steady EOF-MHD flow. This information will be useful in chemical processing industry, combustion industry and allied of engineering.

Keywords: Steady flow, Electro-osmotic; Magneto-hydrodynamic; variable viscosity; variable thermal conductivity; reactive fluid; Weighted Residual (Collocation) method (WRCM).

Author: Dr JOSHUA, AJILORE (Department of mathematical Science, Lagos State University of Science and Technology, Ikorodu,Lagos , Nigeria)

Co-authors: Dr RASAQ, Kareem (Department of mathematical Science, Lagos State University of Science and Technology, Ikorodu,Lagos , Nigeria); Dr OLAKUNLE, Salawu (Department of Mathematics, Bowen University, Iwo, Nigeria); Mr SAMUEL, Sogunro (Department of mathematical Science, Lagos State University of Science and Technology, Ikorodu,Lagos , Nigeria)

Presenter: Dr JOSHUA, AJILORE (Department of mathematical Science, Lagos State University of Science and Technology, Ikorodu,Lagos , Nigeria)

Session Classification: Technical session 1