

Magnetohydrodynamics effect on convective boundary layer flow and heat transfer of viscoelastic micropolar fluid past a sphere

Laila Amera Aziz¹, Abdul Rahman Mohd Kasim¹, Mohd Zuki Salleh¹, Nur Syahidah Yusoff¹ and Sharidan Shafie²

¹Applied & Industrial Mathematics Research Group, Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia

²Department of Mathematical Sciences, Faculty of Science, Universiti Teknologi Malaysia, 81310 Johor, Malaysia

E-mail: rahmanmohd@ump.edu.my/laila@ump.edu.my

Abstract. The main interest of this study is to investigate the effect of MHD on the boundary layer flow and heat transfer of viscoelastic micropolar fluid. Governing equations are transformed into dimensionless form in order to reduce their complexity. Then, the stream function is applied to the dimensionless equations to produce partial differential equations which are then solved numerically using the Keller-box method in Fortran programming. The numerical results are compared to published study to ensure the reliability of present results. The effects of selected physical parameters such as the viscoelastic parameter, K , micropolar parameter, K_1 and magnetic parameter, M on the flow and heat transfer are discussed and presented in tabular and graphical form. The findings from this study will be of critical importance in the fields of medicine, chemical as well as industrial processes where magnetic field is involved.