Magnetohydrodynamic Flow of a Carreau Fluid in a Channel with Different Wave Forms

Tasawar Hayat[a,b], Najma Saleem[a], Said Mesloub[b], and Nasir Ali[c]

[a] Department of Mathematics, Quaid-i-Azam University, Islamabad 44000, Pakistan
[b] Department of Mathematics, King Saud University Riyadh 11451, Saudi Arabia
[c] Faculty of Basic and Applied Sciences, International Islamic University, Islamabad 44000, Pakistan

Reprint requests to T. H.; E-mail: pensy_t@yahoo.com

In this investigation, we discuss the peristaltic motion based on the constitutive equations of a Carreau fluid in a channel. The fluid is electrically conducting in the presence of a uniform applied magnetic field. Four different wave forms are chosen. The fluid behaviour is studied using long wavelength approximation. Detailed analysis is performed for various emerging parameters on pumping and trapping phenomena. The present results reduce favourably with the currently available results of hydrodynamic case when the Hartman number is chosen zero.

Key words: Symmetric Channel; Magnetic Field; Trapping.