

Second Law Analysis in Magnetohydrodynamic Peristaltic transport of a Jeffrey Nanofluid through an asymmetric non-uniform channel

K. M Prasad^a, P Raja Shekhar^{b,*}, R Bhuvana Vijaya^c

^a*Department of Mathematics, GITAM University, Hyderabad 502329, Telangana, India*

^b*Department of Mathematics, Vignan Institute of Technology And Science, Hyderabad 508284, Telangana, India*

^c*Department Mathematics, JNTUA, Ananthapuramu 515002, Andhra Pradesh, India*

*Corresponding author Email: rajoct25@gmail.com

Abstract

Of concern in this paper, peristaltic transport of an incompressible Jeffrey Nanofluid through an asymmetric non-uniform channel has been addressed. The present paper looks at the effect of entropy, magnetic field, buoyancy forces, thermophoresis, and Brownian motion. Well established high wavelength and small Reynolds number approximations are invoked. The exact solution for the temperature, concentration has been evaluated. The results of temperature and concentration fields are utilized to determine the Skin friction, Nusselt number. Effects of thermal radiation, Hartman number, Brownian motion parameter, and thermophoresis are explored in detail. It has been observed that temperature is a decreasing function of Hartman number and radiation parameter.

Keywords: Entropy, Nanofluid, Assymetric non-uniform channel, Thermophoresis.