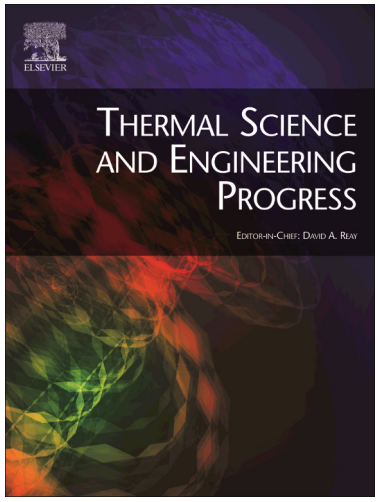

Peristaltic transport of tangent hyperbolic fluid with variable viscosity

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Peristaltic transport of tangent hyperbolic fluid with variable viscosity

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Abstract: This investigation examines the influence of variable viscosity on peristaltic transport of tangent hyperbolic fluid with heat and mass transfer. Viscous dissipation and Joule heating have been taken. Temperature dependent viscosity is considered. An electrically conducting fluid is taken in symmetric inclined channel. Effect of heat and mass transfer are outlined. Channel inclination dominates gravitational effects such that the mixed convection is not ignored. Soret and Dufour effects are highlighted. The mathematical expressions are subject to lubrication approach. Decline in velocity is noticed with an increase in magnetic field and gravitational effects. Whereas larger values of Soret and Dufour number raise the temperature and heat transfer rate. The graphs in present communication have been sketched directly using NDSolve built in routine of Mathematica.

Keywords: Peristaltic motion, Mixed convection, Soret and Dufour effects, Tangent hyperbolic fluid, Inclined channel.

1 Introduction

Peristalsis is fluid transport which occurs due to the propagation of waves along the walls of channel. Such propagation of fluid is important due to its applications in engineering as well as in physiological processes. Physical-process like urine passage through the ureter, motion of the chyme, swallowing food, motion of lymph, spermatozoa motion and the ovum transport in the female fallopian tube works through peristalsis. Industrial applications of peristalsis covers designing of roller pumps, biomedical system and noxious fluid transport in nuclear industry. Processes of endoscope, hyperthermia, magnetotherapy, cancer therapy and arterial flow are designed on the principle of peristaltic pumping, peristalsis is hot topic of interest in recent time after theoretical attempts of Latham [1] and Shapiro et al. [2].

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