

Accepted Manuscript

Peristaltic transport of tangent hyperbolic fluid with variable viscosity

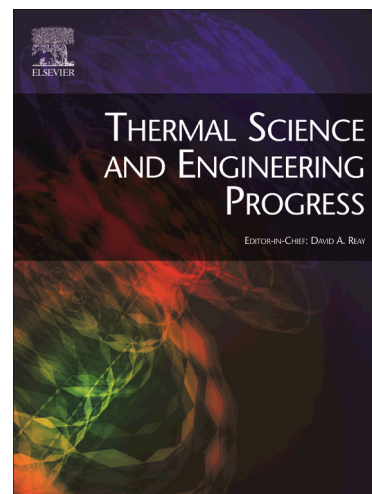
T. Hayat, Asma Riaz, Anum Tanveer, Ahmed Alsaedi

PII: S2451-9049(17)30272-X

DOI: <https://doi.org/10.1016/j.tsep.2018.04.002>

Reference: TSEP 157

To appear in: *Thermal Science and Engineering Progress*



Please cite this article as: T. Hayat, A. Riaz, A. Tanveer, A. Alsaedi, Peristaltic transport of tangent hyperbolic fluid with variable viscosity, *Thermal Science and Engineering Progress* (2018), doi: <https://doi.org/10.1016/j.tsep.2018.04.002>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Peristaltic transport of tangent hyperbolic fluid with variable viscosity

T. Hayat^{a,b}, Asma Riaz^a, Anum Tanveer^a,¹ and Ahmed Alsaedi^b

^aDepartment of Mathematics, Quaid-I-Azam University 45320, Islamabad 44000, Pakistan

^bNAAM Research Group, Department of Mathematics, Faculty of Science, King Abdulaziz University, Jeddah 21589, Saudi Arabia.

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].

¹Corresponding author. Tel.: + 92 51 90642172.

e-mail address: anum@math.qau.edu.pk

Download English Version:

<https://daneshyari.com/en/article/8918742>

Download Persian Version:

<https://daneshyari.com/article/8918742>

[Daneshyari.com](https://daneshyari.com)