

Abstract

The present dissertation deals with a set of mathematical models of some peristaltic flow problems concerned with physiological fluids. The problems have got strong relevance to different physiological processes, such as fluid movement in the gastrointestinal tract, microcirculation through small blood vessels, intra-uterine fluid motion induced by uterine contraction, food transport through esophagus as well as flow of bile through common bile duct. Results presented in the dissertation bear the potential to explore a host of important informations that are useful for having a better insight into the phenomenon of peristalsis occurring in the movement of several physiological fluids in the normal/pathological states.

Keywords: Peristalsis, physiological fluids, non-Newtonian fluids, asymmetric channel, pumping, trapping, reflux, trajectory, flow reversal, porosity, critical pressure for reflux, Darcy number, SSD wave, single wave, shear stress.