

Effect of Homogeneous and Heterogeneous Chemical Reactions on Peristaltic Flow of a Jeffrey Fluid in an Asymmetric Channel

Authors : G. Ravi Kiran, G. Radhakrishnamacharya

Abstract : In this paper, the dispersion of a solute in the peristaltic flow of a Jeffrey fluid in the presence of both homogeneous and heterogeneous chemical reactions has been discussed. The average effective dispersion coefficient has been found using Taylor's limiting condition under long wavelength approximation. It is observed that the average dispersion coefficient increases with amplitude ratio which implies that dispersion is more in the presence of peristalsis. The average effective dispersion coefficient increases with Jeffrey parameter in the cases of both homogeneous and combined homogeneous and heterogeneous chemical reactions. Further, dispersion decreases with a phase difference, homogeneous reaction rate parameters, and heterogeneous reaction rate parameter.

Keywords : peristalsis, dispersion, chemical reaction, Jeffrey fluid, asymmetric channel

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