

Influence of Nanoparticles Phenomena on the Peristaltic Flow of Pseudoplastic Fluid in an Inclined Asymmetric Channel with Different Wave Forms

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Abstract : The influence of nanofluid with different waveforms in the presence of inclined asymmetric channel on peristaltic transport of a pseudoplastic fluid is examined. The governing equations for two-dimensional and two directional flows of a pseudoplastic fluid along with nanofluid are modeled and then simplified under the assumptions of long wavelength and low Reynolds number approximation. The exact solutions for temperature and nanoparticle volume fraction are calculated. Series solution of the stream function and pressure gradient are carried out using perturbation technique. The flow quantities have been examined for various physical parameters of interest. It was found, that the magnitude value of the velocity profile decreases with an increase in volume flow rate (Q) and relaxation times (ζ) and increases in sinusoidal, multisinusoidal, trapezoidal and triangular waves. It was also observed that the size of the trapping bolus decreases with the drop of the width of the channel 'd' and increases with a rise of relaxation times ζ .

Keywords : nanofluid particles, peristaltic flow, pseudoplastic fluid, different waveforms, inclined asymmetric channel

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