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Geometrical Fluid Model for Blood Rheology and Pulsatile Flow in Stenosed Arteries

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Abstract : Considering blood to be a non-Newtonian Carreau liquid, this indirect numerical model investigates the pulsatile blood flow in a constricted restricted conduit that has numerous gentle stenosis inside the view of an increasing body speed. Asymptotic answers are obtained for the flow rate, pressure inclination, speed profile, sheer divider pressure, and longitudinal impedance to stream after the use of the twofold irritation approach to the problem of the succeeding non-straight limit esteem. It has been observed that the speed of the blood increases when there is an increase in the point of tightening of the conduit, the body speed increase, and the power regulation file. However, this rheological manner of behaving changes to one of longitudinal impedance to stream and divider sheer pressure when each of the previously mentioned boundaries increases. It has also been seen that the sheer divider pressure in the bloodstream greatly increases when there is an increase in the maximum depth of the stenosis but that it significantly decreases when there is an increase in the pulsatile Reynolds number. This is an interesting phenomenon. The assessments of the amount of growth in the longitudinal resistance to flow increase overall with the increment of the maximum depth of the stenosis and the Weissenberg number. Additionally, it is noted that the average speed of blood increases noticeably with the growth of the point of tightening of the corridor, and body speed increases border. This is something that can be observed.

Keywords : geometry of artery, pulsatile blood flow, numerous stenosis
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