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Effect of Radiation on Magnetohydrodynamic Two Phase Stenosed Arterial Blood Flow with Heat and Mass Transfer

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Abstract : In blood, the concentration of red blood cell varies with the arterial diameter. In the case of narrow arteries, red blood cells concentrate around the center of the artery and there exists a cell-free plasma layer near the arterial wall due to Fahraeus-Lindqvist effect. Due to non- uniformity of the fluid in the narrow arteries, it is preferable to consider the two-phase model of the blood flow. In the present article, coupled nonlinear differential equations have been developed for momentum, energy and concentration of two phase model of the blood flow assuming the Newtonian fluid in both central core and cell free plasma layer and the exact solutions have been found for the problem. For having an adequate insight into the stenosed arterial two-phase blood flow, major components of the flow as flow resistance, total flow rate, and wall shear stress have been estimated for different values of magnetic and radiation parameter. Results show that the increase in the effects of magnetic field decreases the velocity of both cores as well as plasma regions. This result can be helpful to control the blood flow in narrow arteries during surgical process. Temperature of core as well plasma regions decrease as value of radiation parameter increases. The present result is implemented in the form of radiation therapy which is very helpful for cancer patients.

Keywords : two phase blood flow, radiation, magnetohydrodynamics (MHD), stenosis
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