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A mathematical analysis of MHD blood flow of Eyring-Powell fluid through a constricted artery

(2016) *International Journal of Biomathematics*, 9 (2), art. no. 1650027, . Cited 3 times.

Abstract

The present study deals with the flow of blood through a stenotic artery in the presence of a uniform magnetic field. Different flow situations are taken into account by considering the regular and irregular shapes of stenosis lying inside the walls of artery. Blood inside the artery is assumed to be Eyring-Powell fluid. A mathematical model is developed and simplified under the physical assumptions of stenosis. The regular perturbation method is adopted to find the solutions for axial velocity and pressure gradient. The variations in pressure drop across the stenosis length, the impedance and the shear stress at the walls of stenotic artery are discussed in detail through graphs. It is observed that the Eyring-Powell fluid is helpful in reducing the resistance to the flow in stenotic artery. Moreover, symmetric form of stenosis is more hazardous as compared to asymmetric stenosis. © 2016 World Scientific Publishing Company.

2-s2.0-84955171179

Document Type: Article

Publication Stage: Final

Source: Scopus