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INFLUENCE OF SLIP VELOCITY AND VARIATIONS IN BLOOD VISCOSITY ON BLOOD FLOW IN A DISEASED ARTERY CHARECTERIZED BY TIME DEPENDENT STENOSIS

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Abstract: The aim of this paper is to investigate the effect of slip velocity and axial variation in blood viscosity on the flow dynamics within an artery characterized by time-dependent stenosis. The blood viscosity is found to be contingent upon the axial coordinate, leading to an ascending viscosity trend towards the highest point of stenosis, followed by a subsequent descent. Employing analytical methodologies, this study delves into the intricacies of the issue, deriving equations governing volumetric flow rate, flow resistance, axial velocity and shearing stress on wall. Notably, an increase in the stenosis height correlates with heightened flow resistance and augmented wall shear stress. The novelty of this study lies in its comprehensive approach to modeling the simultaneous effects of slip velocity and variable blood viscosity in a time-varying stenosed artery, a topic previously unexplored.

Keywords and Phrases: Time-dependent stenosis, resistance to flow, shearing stress on wall, slip velocity, blood viscosity, flow of blood.

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Nomenclature

$(-t/T)$	Dimensionless time
α	Index of viscosity variation