STUDY OF THE ELECTRO-OSMOTIC PHENOMENON IN THE PERISTALTIC FLOW OF FRACTIONAL SECOND-GRADE FLUID THROUGH A CYLINDRICAL TUBE WITH HEAT AND MASS TRANSFER

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Abstract

This study's ambitious purpose is to examine how rheological effects on peristaltic activity through a tube and electro-osmotic processes interact. The Poisson-Boltzmann equation is taken into account to investigate the electro-kinetic phenomenon. A fractional second-grade liquid model is used to explain the rheological deeds of the liquid. An aqueous ionic solution like blood is considered. Using Caputo's definition, the problem's analytical resolution is attained. With a peristaltic cylindrical tube, the consequences of double-diffusive convection on the viscoelastic fluid are brought up. To examine the unique characteristics of pressure rise and friction force, numerical integration is used. Many regulatory elements' effects are looked at and shown in a series of graphs. The significance of the findings lies in their demonstration that pressure gradient continuously improves as the exterior electric field's intensity upsurges. It is as well strong that the pressure gradient's negative value can be influenced by how strong the external electric field becomes. The analysis that is being given is anticipated to be extremely beneficial in the treatment of tissue cancer.

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