Mathematical analysis of ferroparticles suspended Casson blood flow in vessels under external magnetic field

Abid Hussanan[1], Irfan Ahmed[2], Mohd Zuki Salleh[1]
[1]Applied & Industrial Mathematics Research Group, Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang, Pahang, Malaysia
abidhussnain_utm@yahoo.com, zukikuj@yahoo.com
[2]Advance Materials Group, Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang, Pahang, Malaysia
irfanzaid2004@yahoo.com

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Blood is considered as non-Newtonian fluid comprising of red blood cells (RBCs) and plasma. In the development of therapeutic and drug delivery the blood mediated nanoparticles is an emerging and growing filed. The nanoparticle properties such as, shape, size and surface chemistry can be controlled to enhance the effectiveness and efficacy of the drug delivery to targeted effective zone [1]. The ability of the nanoparticles to target and enter the effective zone is extremely depends on their behaviour in the blood fluid. Here we introduce a mathematical model of nanoparticle behaviour under blood flow and how their trajectory can be controlled by application of an external magnetic field [2]. In other words, a mathematical model of magnetohydrodynamics (MHD) ferroparticles based Casson blood flow through blood vessels is studied. The governing coupled nonlinear partial differential equations of the problem are non-dimensionalized by using appropriate similarity transformations. These non-dimensional equations along with the corresponding boundary conditions are solved numerically using Keller-Box method in MATLAB for different emerging parameters. The results showed that the effect of particle size and morphology are two important parameters which should be considered for an effective treatment of diseased cells. Especially the models is helpful for prediction of effective treatment of cancer cells.

References

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