Abstract

The aim of this work to present the theoretical study the flow of both blood and magnetic particles. The tube is considered as a circular cylinder form and the blood is flowing through it under the influence of uniform magnetic field and an external oscillating pressure gradient. Exact solutions for the fluid and magnetic particles velocities that are obtained by means of integral transforms.

Moreover, a semi-analytical solution based on the Bessel equation and Tzous algorithm for the inverse Laplace transform is studied. Furthermore, the same model is studied using Caputo-Fabrizio fractional derivative model approach.

Finally, in order to study the influence of the material parameters, numerical simulations and graphical illustrations are used and useful conclusions are summarized.