A new approach for the generalized fractional Casson fluid model with Newtonian heating described by the modified Riemann-Liouville fractional operator

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Abstract

This research is about the transfer of heat of a generalized fractional Casson fluid on an unsteady boundary layer which is passing through an infinite oscillating plate, in vertical direction combined with the Newtonian heating. The results are obtained by using modified Riemann-Liouville fractional derivative. The present fluid model, starts with the governing equations which are then converted to a system of partial differential equations(linear) by using some suitable non-dimensional variables. Using the method of integral balance and the Laplace transform technique, an analytical solution is obtained. The velocity and temperature expressions are derived and the effects of modelling parameters re shown in tables and graphs to validate the obtained theoretical results.

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