

**Title:** Fractional Casson Fluid Flow via Oscillating Motion of Plate and Microchannel

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**Abstract:**

The impact of the Caputo fractional derivative on the unsteady mixed convection boundary layer flow of Casson fluid is investigated. It is evaluated the flow via two different geometries which are plate and microchannel with oscillating motion. The problems are modelled using a set of partial differential equations with appropriate initial and boundary conditions. The dimensional equations are turned into dimensionless governing equations by using relevant dimensionless variables. The obtained solutions are transformed into fractional form using Caputo fractional derivative. The exact solutions are obtained using the Laplace transform approach. Inverse Laplace transform is applied to the oscillating plate problem while Zakian's explicit formula approach is used to obtain the results of temperature and velocity profiles. Both profiles are graphed and studied its behaviour in both geometries. The temperature profile is shown to have an opposite pattern of graph for both geometries. While when compared between both geometries on its velocity profile, oscillating plate has a higher velocity compared to oscillating plate. For both profiles, increasing the fractional parameter resulted in a greater pattern. This study aids in the comprehension of Casson fluid flows in fractional systems.