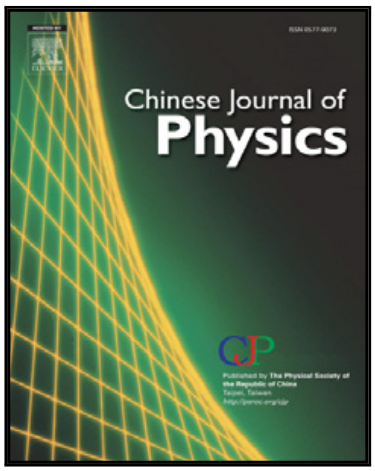

An analysis of the semi analytic solutions of a viscous fluid with old and new definitions of fractional derivatives

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Highlights

- Mathematical modeling of a viscous fluid is proposed with fractional derivatives.
- Semi analytical solutions are obtained via the Laplace transform method.
- The heat, mass and skin friction coefficients are also calculated.
- Transfer rates of the Caputo-Fabrizio derivative have higher values than the Caputo derivative.
- The fractional viscous fluid with the Caputo-Fabrizio derivative has a higher velocity than with the Caputo derivative.