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Munawar, S., Saleem, N., Mehmood, A.

Entropy production in the flow over a swirling stretchable cylinder
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Abstract
In the present work, the entropy generation due to the heat transfer and fluid friction irreversibility is investigated numerically for a three-dimensional flow induced by rotating and stretching motion of a cylinder. The isothermal boundary conditions are taken into account for the heat transfer analysis. The similarity transformations are utilized to convert the governing partial differential equations to ordinary differential equations. Resulting nonlinear differential equations are solved using a numerical scheme. Expressions for the entropy generation number, the Nusselt number and the Bejan number are obtained and discussed through graphs for various physical parameters. An analysis has been made to compare the heat transfer irreversibility with fluid friction irreversibility using the expression of the Bejan number. It is found that the surface is a durable source of irreversibility and the curvature of cylinder is to enhance the fluid friction irreversibility. © 2016, Pleiades Publishing, Ltd.

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