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Effect of melting and heat generation/absorption on Sisko nanofluid over a stretching surface with nonlinear radiation
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Abstract
The aim of the present investigation is framing the features of heat generation/absorption and chemical reaction on a non-Newtonian (Sisko) nanofluid over a stretching surface under the influence of nonlinear radiation. The non-dimensionally developed boundary layer equations are first deduced with suitable transformations and then solved numerically by the Runge-Kutta-Fehlberg fourth-fifth method with shooting technique for different values of parameters. The most relevant outcomes of the present study are that augmented magnetic field strength and melting parameter undermine the flow velocity establishing a thinner hydrodynamics boundary layer, while the Sisko fluid parameter, stretching parameter and Prandtl number show the opposite trend. Another important outcome is that an increase in the Sisko fluid parameter, stretching parameter and heat generation decreases the fluid temperature leading to a diminution in the thermal boundary layer. The effects of different natural parameters on the skin friction coefficient, Nusselt and Sherwood numbers are examined graphically. For a limiting case of the present model, an excellent agreement has been found for the obtained solution with the existing literature. © 2019 IOP Publishing Ltd.

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