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Impact of nonlinear radiative nanoparticles on an unsteady flow of a Williamson fluid toward a permeable convectively heated shrinking sheet
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Abstract
Purpose: The study aims to numerically examine the impact of nanoparticles on an unsteady flow of a Williamson fluid past a permeable convectively heated shrinking sheet. Design/methodology/approach: In sort of the solution of the governing differential equations, suitable transformation variables are used to get the system of ODEs. The converted equations are then numerically solved via the shooting technique. Findings: The impacts of such parameters on the velocity profile, temperature distribution and the concentration of nanoparticles are examined through graphs and tables. The results point out that multiple solutions are achieved for certain values of the suction parameter and for decelerating flow, while for accelerating flow, the solution is unique. Further, the non-Newtonian parameter reduces the fluid velocity and boosts the temperature distribution and concentration of nanoparticles in the first solution, while the reverse drift is noticed in the second solution. Practical implications: The current results may be used in many applications such as biomedicine, industrial, electronics and solar energy. Originality/value: The authors think that the current results are new and significant, which are used in many applications such as biomedicine, industrial, electronics and solar energy. The results have not been considered elsewhere. © 2018, Emerald Publishing Limited.

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