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Numerical solution of second law analysis for MHD Casson nanofluid past a wedge with activation energy and binary chemical reaction
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Abstract
Purpose - This paper aims to peruse the influence of second law analysis for electrically conducting fluid of a Casson nanofluid over a wedge. For activation energy, a modified Arrhenius function is used. Design/methodology/approach - The highly non-linear governing equations are developed using similarity transformations and then computed numerically via Keller-Box method. Findings - The influences of emerging parameters on velocity, temperature distribution and concentration of nanoparticle are explained and presented via graphs and tables. Also, the behavior of fluid flow is investigated through the coefficient of skin friction, Nusselt and Sherwood numbers. Results reveal that the velocity profile enhances due to increasing Casson parameter and magnetic parameter, whereas the temperature distribution and concentration of nanoparticle decrease with larger vales of Casson parameter. It is inspected that the concentration boundary layer increases due to activation energy and decreases due to reaction rate and temperature differences. Originality/value - The authors believe that all the numerical results are original and significant which are used in biomedicine, industrial, electronics and transportation. The results have not been considered elsewhere. © Emerald Publishing Limited.

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