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| Title | Boundary layer flow of a nanofluid past a horizontal flat plate in a Darcy porous medium: A Lie group approach | | |
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| Abstract |  |
| his research paper addresses the two-dimensional steady laminar incompressible free convective flow of a nanofluid past a horizontal plate saturated in the porous medium, where both the thermal and the mass convective boundary conditions are taken into consideration. Mathematical modeling via similarity transformations (which was developed using one-parameter continuous group of transformation) was applied to obtain a reduced mathematical model, which describes the problem. The solutions of the reduced system were obtained by a numerical method called the fourth- and fifth-order Runge–Kutta–Fehlberg method with the aid of computational software called Maple version 13. The resulting distributions of dimensionless temperature, velocity, and nanoparticle volume fraction are studied graphically to demonstrate the effect of pertinent parameters. Moreover, some of the new findings are shown in graphs. An excellent agreement was found after comparing the results with the previous literature, which assures the validity of the analysis. It is found that the flow is accelerated with an increase in thermal and mass convective parameters. Temperature and concentration are enhanced for rising values of (thermal and concentration) conjugate parameters. | |