Lower Stagnation Point Flow of Convectively Heated Horizontal Circular Cylinder in Jeffrey Nanofluid with Suction/Injection

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Abstract:
Lower stagnation point flow of Jeffrey nanofluid from a horizontal circular cylinder is addressed under the influences of suction/injection, mixed convection and convective boundary conditions. Copper (Cu) is taken as the nanoparticles while Carboxymethyl cellulose (CMC) water is taken as the base fluid. The transformed boundary layer equations through the nondimensional variables and non-similarity transformation variables are subsequently tackled by means of the Runge-Kutta Fehlberg method (RKF 45). The impact of dimensionless parameters such as the suction/injection, nanoparticles volume fraction and Deborah number are graphically presented and discussed in detail. The outcomes reveal that both the velocity and temperature profiles are augmented with upsurge volume fraction values of nanoparticles. Velocity profile escalates as suction/injection parameter rises but declines as Deborah number upsurges. Temperature profile reduces when suction/injection parameter enlarges and augments when Deborah number increases.

Keywords: Carboxymethyl cellulose (CMC); Runge-Kutta Fehlberg; Copper (Cu)

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