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Magnetohydrodynamics Mixed Convection of Viscoelastic Nanofluid Past a Circular Cylinder with Constant Heat Flux

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Abstract:
A mathematical model for viscoelastic nanofluid flow approaching a linear horizontal circular cylinder in magnetohydrodynamics (MHD) has been developed. In the analysis, the cylinder with a constant heat flux is shown with a magnetic field. In this research, we employed the Tiwari and Das Nanofluid model to learn more about the impacts of nanofluids, and sodium carboxymethyl cellulose containing copper (Cu) nanoparticles was used as the base fluid. Dimensional linear equations are converted into dimensionless expressions using the appropriate transformations. The Keller box technique approach is used to handle the governing dimensionless concerns. Investigations are conducted on how a select few parameters affect flow and heat transfer. It includes and analyses the skin friction and heat transfer coefficients. When the obtained results are compared to the available data in the limiting situation, there is a great deal of congruence. It was discovered that the viscoelastic nanofluid's velocity, temperature, skin friction, and heat transfer coefficients heavily depend on the viscosity and thermal conductivity combined with the magnetic field and nanoparticles volume fraction.