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(57) Abstract :
The aim of this work is to explore the mass and heat transfer of MHD Williamson nanofluid in a porous medium towards a stretching surface with Cattaneo-Christov double diffusion. We also looked at how the current flow was affected by radiation, chemical reactions, heat production, and suction and injection. With the use of suitable transformations, the mathematical model (PDEs) was converted into nonlinear coupled ODEs. Using the bvp5c MATLAB software, the system of simplified differential equations' numerical solution was found. Using graphs and tables, the behaviour of several parameters on the flow regime is analysed and displayed. It is established that the velocity field decreases with an increase in the suction parameter, porosity parameter, and magnetic field.In addition, the rate of heat transfer increases as thermal radiation rises, but it decreases as thermophoresis, heat generation, thermal relaxation time, concentration relaxation time, and Brownian motion values rise. The current findings are validated using the body of literature already in existence, and a strong agreement is observed. The findings of this investigation support significant uses in the biomedical, engineering, and industrial domains in areas include food processing, polymer synthesis, glass and fibre manufacture, enhancing oil recovery, and material processing.

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