Heat Transfer Enhancement through Hybrid Metallic Nanofluids Flow with Viscous Dissipation and Joule Heating Effect

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Abstract : We present the numerical study of unsteady hydromagnetic (MHD) flow and heat transfer characteristics of a viscous incompressible electrically conducting water-based hybrid metallic nanofluid (containing Cu-Au/ H_2O nanoparticles) between two orthogonally moving porous coaxial disks with suction. Different from the classical shooting methodology, we employ a combination of a direct and an iterative method (SOR with optimal relaxation parameter) for solving the sparse systems of linear algebraic equations arising from the FD discretization of the linearized self similar nonlinear ODEs. Effects of the governing parameters on the flow and heat transfer are discussed and presented through tables and graphs. The findings of the present investigation may be beneficial for the electronic industry in maintaining the electronic components under effectiveand safe operational conditions.