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Magneto-Rheological rotational flow between coaxial cylinders NARIMAN ASHRAFI, Science and Research branch, Azad University, Tehran, ABBAS HAZBAVI, Azad University — Effects of a magnetic field and fluid nonlinearity are investigated for the rotational flow of a nonlinear viscoelastic fluid following the Carreau model while viscous dissipation is taken into account. The governing motion and energy balance equations are coupled, adding complexity to the already highly correlated set of differential equations. The numerical solution is obtained for the narrow gap limit and steady state base flow. Magnetic field effect on local entropy generation due to steady two-dimensional laminar forced convection flow was investigated. This study was focused on the entropy generation characteristics and its dependency on various dimensionless parameters. The effects of the Hartmann number, the Brinkman number, and the Deborah number on the stability of the flow were investigated. Introduction of the magnetic field induces resistive force acting in the opposite direction of the flow, thus causing its deceleration. Moreover, the study shows that the presence of magnetic field tends to slow down the fluid motion. It, however, increases the fluid temperature. Moreover, the total entropy generation number decreases as the Hartmann number and fluid elasticity increase and increases with increasing Brinkman number.

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