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Flow between concentric cylinders driven by an electromagnetic force JOSE NUNEZ, EDUARDO RAMOS, SERGIO CUEVAS, Universidad Nacional Autonoma de Mexico, SERGEY SMOLENTSEV, University of California, Los Angeles — We study a two-dimensional magnetohydrodynamic (MHD) laminar flow of a viscous electrically conducting fluid between concentric cylinders. The flow is produced by an electromagnetic force due to the interaction of a uniform axial magnetic field and a radial electrical current. We analyzed two situations, namely, when the electric current is produced by a steady potential difference between the walls of the cylinders and when the potential difference oscillates in time. The magnetic field induced by the fluid motion is assumed to be negligible compared to the applied magnetic field. In both cases, the flow is described in terms of closed analytical expressions. A parametric study covering a range of Hartmann numbers is conducted and it is found that for a given a electrical potential difference, the fluid velocity as a function of the Hartmann number has a local maximum.

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