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Unstable vortical flow produced by an oscillatory non-uniform magnetic field[1] ALBERTO BELTRAN, SERGIO CUEVAS, EDUARDO RAMOS, Universidad Nacional Autonoma de Mexico — We report two-dimensional numerical simulations of an electromagnetically forced flow, produced by the interaction of an imposed direct electrical current and a localized time-dependent magnetic field. The field is produced by a permanent dipolar magnet that oscillates harmonically along a direction parallel to the injected current with fixed frequency and amplitude. When the magnet remains steady, the localized Lorentz force produces a vortex dipole with a jet-like flow along the symmetry line in the direction of the force, perpendicular to both the injected current and the normal magnetic field. For certain oscillation frequencies of the magnet, the jet-like flow is destabilized and local vortical structures, formed in the neighborhood of the magnet, are swept away periodically by the base flow. Numerical results show a qualitative agreement with preliminary experiments performed in a shallow electrolitic fluid layer.

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