

Analysis of Short Magnetohydrodynamic Journal Bearings

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ABSTRACT

Investigations on the load capacity of short magnetohydrodynamic journal bearings in the presence of toroidal, axial and radial magnetic fields are carried out. An electric field is oriented either in axial or in radial direction. Stiffness and damping coefficients of the lubricant film are calculated. The stability behaviour of a rigid rotor supported on short MHD journal bearings is analyzed. Solutions for the critical speed are achieved and examined for various values of the Hartmann number and the dimensionless terminal voltage.

Keywords: short MHD journal bearing, incompressible fluid, rotor stability