

This book is concerned with theoretical study for the thermal effects of the hydrodynamic journal bearings lubricated by ferrofluids with couple stresses. The study is generalize such that it covered both Newtonian and non-Newtonian behavior of the lubricant. Based on the momentum and continuity equations for ferrofluid under an applied magnetic field, a pressure differential equation (modified Reynolds equation) has been obtained. Assuming linear behavior for the magnetic material of the ferrofluid, and using carrying current concentric finite wire magnetic field model, the magnetic force was calculated. A modified Reynolds equation is obtained and it is simultaneously solved with the energy equation numerically by the finite difference technique. The pressure and temperature distributions have been obtained. The solution renders the bearing performance characteristics namely; load carrying capacity, attitude angle of the journal center, frictional force at the journal surface, friction coefficient and bearing side leakage.



Hany S. Abdo

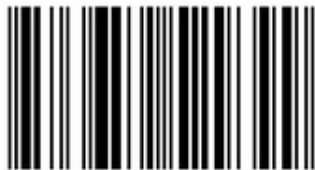
Hydrodynamic Journal Bearings Lubricated By Magnetic Fluids

Thermodynamically Analysis



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