Hydromagnetic Based Squeeze Bearing Deformation with Transverse Roughness Effects on the Performance of a Film along with Velocity Slip on Rectangular plate

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Abstract

This work describes the bearing deformation and slip velocity that occur as a result of the interaction in hydro magnetic squeeze film and Transverse irregularity factor on rectangular plate. During the investigation, the hydro magnetic lubrication theory and the slip model developed by Beavers and Joseph were used. Additionally, the generalized Reynolds type equations for the pressure of the fluid film were obtained by applying the appropriate boundary conditions. Finally, the expressions for distribution of pressure and bearing's load capacity as a function of slip parameter, roughness parameter, and Hartman number were derived. The stochastic averaging model that Christensen and Tonder developed has been utilized in this study so that the influence of Transverse roughness can be determined. It has come to light that the implementation of the magnetic field effect results in a discernible in the load-carrying capacity of the system as a whole. Although the combined effect of bearing deformation and slip velocity can be overcome to a great extent when negatively skewed roughness occurs, it is made abundantly evident by the data that are graphically shown that this is not always the case. It is still necessary to keep the slip parameter as low as possible in order to achieve any type of improvement in the bearing performance characteristics. This is the case even if the parameter is kept as low as possible.

Keywords:

Slip velocity, rectangular plates, deformation, hydro magnetic fluid, roughness.