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Load Capacity for Porous Journal Bearing with Nanolubricant under Second Order Rotation

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Abstract

The analysis of infinitely short porous bearing is conferred supported the concept of journal bearings and takes into thought of fluid film thickness and viscosity of nanoparticles additive fluid. In the present paper, the results of additives on the nanolubricants have been investigated and according, aiming for improvement and also the development of hydrodynamic bearing performance. The nanolubricant Aerosil is used with 3%, 3.5%, 4% and 4.5% of volume concentration and viscosity was considered as mingling achieved in oil based hydrophilic Aerosil 200 and numerous hydrophobic Aerosil types. A dimensionless Load Capacity with viscosity over the fluid film has been calculated. The results show an increase on the Load Capacity in response to increase in the viscosity of the additives with percent volume concentration and relevance the rotation number (M). The non-dimensional Load Capacity is obtained from integration of Pressure Equation under the impact of second order rotation by using the Reynolds boundary conditions. The fluid film properties and structure significantly influence the film fluid lubrication for the nanolubricants with respect to the impact of second order rotation.

Keywords: Bearing Load Capacity; Nanolubricants; Porous journal bearing, Second order rotation.

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