

عنوان مقاله:

Three Dimensional Numerical Analysis of Hydrodynamic Characteristics by Applying Magnetic Field on Journal Bearing Lubricated with Ferrofluid

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خلاصه مقاله:

In this study, hydrodynamic characteristics of finite length journal bearings running with incompressible laminar flow under magnetic field is investigated. Ferrofluid as a lubricant contains nano particles of magnetite (Fe_3O_4). The analysis is based on the numerical solution of the full Navier-Stokes equations using CFD techniques. Considering the complexity of the physical geometry, conformal mapping is used to generate an orthogonal grid and the governing equations are transformed in the computational domain. Discretized forms of the transformed equations are obtained by the control volume method and solved by the SIMPLE algorithm. Results indicated that comparing with conventional lubricant, the ferrofluid as a lubricant enhances the hydrodynamic characteristics of journal bearing and provides a higher load capacity. Besides, it was found that the other bearing characteristics are considerably affected by the applied magnetic field.

کلمات کلیدی:

ferrofluid, journal bearing, CFD, hydrodynamic characteristic, laminar flow

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