

Article Abstract

Title:	Computational analysis of journal bearing operating under lubricant containing Al ₂ O ₃ and ZnO nanoparticles
Author(s):	Kalakada Sreedhar Babu ^{1*} , K. Prabhakaran Nair ¹ , P.K. Rajendrakumar ¹
Address(es):	¹ Department of Mechanical Engineering, National Institute of Technology Calicut, Kerala-673601, INDIA *Corresponding Author: e-mail: sbkalakada@yahoo.com, Tel +91-9037689649
Journal:	<i>International Journal of Engineering, Science and Technology</i> , Vol. 6, No. 1, 2014, pp. 34-42
Abstract:	In this paper, the mathematical model developed for relationship between viscosity and temperature for the lubricant SAE 15W40 multi grade engine oil with Al ₂ O ₃ and ZnO nanoparticles is presented. The developed mathematical model for viscosity and temperature of lubricant containing nanoparticles is used for the computation of static performance characteristics of the bearing. These performance characteristics mainly depend on the viscosity of the lubricant. The addition of nanoparticles on commercially available lubricant considerably enhances the viscosity of lubricant and in turn changes the performance characteristics. To obtain pressure and temperature distribution, modified Reynolds and energy equations are used, and these equations are solved by using Finite Element Method. An iterative procedure is used to establish the film extent. The performance characteristics are calculated from the obtained pressure field. The computed results show that addition of nanoparticles increase the viscosity of lubricant and in turn change the performance characteristics of journal bearing.
Keywords:	Journal Bearing; Lubricant additives; Nanoparticles; Static performance Characteristics