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Paper Title: Analysis of Performance Characteristics of Journal Bearing with Micropolar Fluid and Comparison to Newtonian Fluid

Abstract: The present work deals with the dynamic behaviour of a Plane Journal Bearing working in condition of Micropolar lubrication. As from the characteristics of Micropolar fluid the Plane Journal Bearing is being observed under the increase in fluid film pressure and fluid film thickness but a decrease in the side flow as compared to Newtonian fluids. On the basis of the theory of micropolar fluids, the modified Reynolds’s equation for dynamic loads is derived. Results from the numerical analysis indicated that the effects of micropolar fluids on the performance of a dynamically loaded journal bearing are evaluated. Applying the half sommerfeld’s boundary conditions, the pressure distribution in journal bearing is obtained and the dynamic characteristics in terms of the components of stiffness and damping coefficients, friction drag and side flow obtained with respect to the micropolar property for varying eccentricity ratios. The results show that micropolar fluid exhibits better stability in comparison with Newtonian fluid. The finite element analysis of journal bearing has done by using programming software package MATLAB.

Keywords: Finite Element Analysis, Newtonian Fluid, Reynolds’s Equation, Micropolar Fluid.

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23. Partial differentiation equation tool box –MATLAB.