

A STUDY OF FLUIDS AS LUBRICANTS WITH RESPECTS BEARINGS / JOINTS

Scholar

Jay Pal Singh

Supervisor

Dr. Naseem Ahmad

Department of Mathematics

Jamia Millia Islamia

New Delhi-25, India

The present thesis entitled, “A Study of Fluids as Lubricants with Respects Bearings / Joints,” has been spread over in six chapters. The chapter-1 gives the introduction and overall development of fluid mechanics. This chapter further deals with basic definitions, governing equations of various models and a detailed literature of lubrication theory.

The main aim of chapter-2 is to study the magnetic fluid based porous inclined slider bearing considering thermal effects. In this chapter, we obtain an expression for mean temperature using the velocity field. Further, we derive the formula for load in terms of mean temperature, magnetic parameter and thermal parameter. Computing the values of mean temperature for different values of thermal parameter for $\bar{X} = 0.6$, we discuss the influence of thermal parameter (Pr.E) on temperature graphically. The values of load for different magnetic and thermal parameter have been computed by 1/3 Simpson's rule and the dependence of this load on both these parameters has been shown graphically.

In chapter-3, we study the magnetic fluid lubrication of porous inclined slider bearing with slip velocity. In this chapter we take magnetic fluid as lubricant and we derive a formula for load in the terms of magnetic parameter, slip parameter and permeability parameter. The value of load for different values of these parameters has been computed by trapezoidal rule and the dependence of the load on these parameters has been shown graphically.

In chapter -4, we consider the porous pivoted slider bearings lubricated with a couple stress fluid. In this chapter, we derive a formula for load and a formula for center of pressure in terms of couple stress parameter and permeability parameter. The values of load and center of pressure for different values of couple stress and permeability parameter have been computed by trapezoidal rule. The dependence of the load and center of pressure has been discussed graphically for different values of couple stress parameter by taking the permeability parameter from 0.1 to 0.7.

Chapter-5 deals with magnetic fluid lubrication of porous pivoted slider bearing with slip velocity. In this chapter we explore the possible effect of slip velocity on the load and center of pressure of the bearing.

The sixth chapter of thesis is the last chapter. In this chapter, we analyze a model for couple stress fluid film mechanism with reference to human joints. We derive a formula for load and a formula for pressure in the terms of couple stress parameter, film thickness and porosity parameter. The dependence of load on these parameters has been seen graphically