CONTENTS

Chapters	Description	Page No.
List of symb	(i) - (v)	
Chapter 1	Introduction	01-23
1.1	Motivation of the Present Work	2
1.2	Basic Terms/Definitions/Phenomenons	2
1.3	Brief Literature Review	4
1.4	Investigated Problems of the Thesis	12
1.5	Scope of the Present Work	15
1.6	References	16
Chapter 2 Physico - Mathematical Background		24-57
2.1	Basic Definitions	25
2.2	Various Types of Flows	28
2.3	Magnetic Parameters	31
2.4	Fundamental Equations from Fluid Dynamics	34
	2.4.1 Equation of Continuity	34
	2.4.2 Navier-Stokes Equation (Momentum Equation)	38
	2.4.3 No Slip Condition of Viscous Fluids	42
2.5	Types of Lubrication	43

	2.5.1 Assumptions in Hydrodynamic Lubricated Bearings	44
2.6	The Generalized Reynolds Equation	45
2.7	Discussion on Different Types of Bearings	47
2.8	Concept of Ferrofluid	48
	2.8.1 Equation of Motion for a Magnetic Fluid	49
	2.8.2 Ferrofluids Lubrication Equations Based on Neuringer- Rosensweig Model.	50
2.9	Surface Roughness	51
2.10	References	54
Chapter 3	Squeeze-Film Bearing Made up of Porous and Circumferentially Rough Discs With Micromodel Patterns of Porous Structures	58-90
3.1	Introduction	59
3.2	Mathematical Formulation of the Problem	62
3.3	Solution of the Problem	67
3.4	Results and Discussion	71
	3.4.1 Discussion on Dimensionless Load-Carrying Capacity	72
	3.4.2 Effects of Two Different Micromodel Patterns of Porous structures	74
	1.4.3 Representative Values and Formula for Bessel Function	75
3.5	Conclusions	76
3.6	Table	78
3.7	Figures	79

3.8	References	86

Chapter 4	On the Squeeze-Film Characteristics between Rotating Sphere and a Radially Rough Plate	a91-126
4.1	Introduction	92
4.2	Mathematical Formulation and Solution	97
	4.2.1 Pressure Distribution	103
	4.2.2 Load-carrying Capacity	103
4.3	Results and Discussion	104
	4.3.1 Discussion on Dimensionless Film Pressure	106
	4.3.2 Discussion on Dimensionless Load-Carrying	107
	Capacity	
4.4	Conclusions	109
4.5	Tables	111
4.6	Figures	113
4.7	References	120
Chapter 5	Circular Discs Squeeze-Film Bearings with Porous-Roughness Effects at the Lower Disc	127-155
5.1	Introduction	128
5.2	Formulation of the Mathematical Model	133
	5.2.1 Distribution of Roughness Heights	137
5.3	Solution	141
5.4	Results and Discussion	142

	5.5	Conclusions	145
	5.6	Figures	147
	5.7	References	152
Chapter 6		Effect of Pressure Difference at the Film-Porous Interface on Squeeze-Film Bearing	156-182
	6.1	Introduction	157
	6.2	Mathematical Formulation and Solution	162
	6.3	Numerical Calculations and Discussion of Results	169
	6.4	Conclusions	171
	6.5	Figures	173
	6.6	References	179
List of P	rese	nted Papers	183
List of P	ublis	shed Papers	184