Table of Contents

Abbreviations **v**

List of Figures **vii**

1 Chapter 1 **1–21**

General Introduction

1.1 Introduction 1
1.2 Classification of fluids 2
1.3 Non-Newtonian fluids 3
1.4 Applications of non-Newtonian fluids 3
1.5 Classification of non-Newtonian Fluids 4
1.6 Visco-elastic Fluid 5
1.7 Boundary Layer 6
1.8 Governing equations of fluids 6
1.9 Walters Liquid Model B$^{/}$ 7
1.10 Homotopy perturbation method 8
1.11 Magnetohydrodynamics 9
1.12 Heat transfer 10
1.13 Mass transfer 11
1.14 Porous media 12
1.15 No-slip and slip boundary conditions 12
1.16 Self-similar solution 13
1.17 Chemical Reaction 13
1.18 Non-dimensional parameters 14
1.19 Matlab Code ‘bvp4c’ 17
1.20 Motivation of the study 17
1.21 Objectives of the study 18
1.22 Literature Survey 18

2 Chapter 2 21–32

Heat and Partial Slip Impact on Elastico-Viscous Fluid Flow Past a Flat Permeable Plate

2.1 Introduction 21
2.2 Mathematical Formulation 23
2.3 Method of solution 24
2.4 Results and Discussion 25
2.5 Conclusion 31

3 Chapter 3 33–42

Hydromagnetic Visco-Elastic Boundary Layer Flow Past an Exponentially Stretching Sheet with Suction or Blowing

3.1 Introduction 33
3.2 Mathematical Formulation 35
3.3 Method of solution 36
3.4 Results and Discussion 37
3.5 Conclusion 41

4 Chapter 4 43–56

Reactive Solute Diffusion In Elastico-Viscous Boundary Layer Fluid Flow Over A Flat Permeable Plate With Variable Surface Concentration

4.1 Introduction 43
4.2 Mathematical Formulation 45
4.3 Method of solution 47
4.4 Results and Discussion 48
4.5 Conclusion 56

5 Chapter 5 57–64

Solution of Non-Newtonian Boundary Layer Flow in a Convergent Channel Using Homotopy Perturbation Method

5.1 Introduction 57

5.2 Mathematical Formulation 58
5.3 Method of solution 60
5.4 Results and Discussion 62
5.5 Conclusion 64

6 Chapter 6 65–72

Slip Flow and Heat Transition For Hydromagnetic Elastico Viscous Fluid Past a Flat Moving Plate

6.1 Introduction 65
6.2 Mathematical Formulation 66
6.3 Method of solution 68
6.4 Results and Discussion 68
6.5 Conclusion 72

7 Chapter 7 73–87

Unsteady Elastico-Viscous Boundary Layer Stagnation-Point Slip Flow and Heat Transition Along a Stretching Surface

7.1 Introduction 73
7.2 Mathematical Formulation 75
7.3 Method of solution 77
7.4 Results and Discussion 77
7.5 Conclusion 87

Scope for future work 89

Bibliography 91–104

List of Presentations 105

List of Publications 107

First Page of Paper 1 **109**
First Page of Paper 2 **110**
First Page of Paper 3 **111**
First Page of Paper 4 **112**
First Page of Paper 5 **113**