## ACKNOWLEDGEMENTS

Writing this thesis has been fascinating and extremely rewarding. I would like to thank a number of people who have contributed to present thesis in many different ways.

To commence with, I pay my obeisance to GOD, the almighty to have bestowed upon me good health, courage, inspiration, zeal and the light. After GOD, I express my sincere and deepest gratitude to my supervisor, Dr. Rajesh C. Shah, Associate Professor, Department of Applied Mathematics, Faculty of Technology and Engineering, The Maharaja Sayajirao University of Baroda, who ploughed through several preliminary versions of my text, making critical suggestions and posing challenging questions, constructive criticism, patiently provided the vision. His expertise, invaluable guidance, constant encouragement, affectionate attitude, understanding, patience and healthy criticism added considerably to my experience. Without his continual inspiration, it would have not been possible to complete this study so effectively. I acknowledge the valuable time imparted by my supervisor during completion of this task.

I am extremely thankful to the Dean, Faculty of Technology & Engineering, The Maharaja Sayajirao University of Baroda, and Vice Chancellor, The Maharaja Sayajirao University of Baroda, for providing research facilities during the pursuit of the present work.

I take this opportunity to express my deep sense of gratitude and respectful regards to Dr. D. C. Vakaskar, late Professor and Head, The M. S. University of Baroda for his valuable suggestions and support throughout the work.

I am grateful to my doctoral committee members Professor D. C. Vakaskar (late Head of the Department), Dr. Rajesh C. Shah (Guide), Professor P. S. Kantawala, Dr. Trupti Shah, Dr. Purnika K. Pandit and Professor R. C. Tandel, Professor J. S. Dave for their invaluable critical comments during my research work.

I am highly thankful to all the faculty members of Department of Applied Mathematics, Faculty of Technology & Engineering, The Maharaja Sayajirao University of Baroda, for their kind cooperation and valuable suggestions during this work.

I would like to extent my sincere thanks to all the eminent people whose research works, findings, and analyses in this area inspired me to undertake this research topic. I also wish to thank

my fellow research scholars Dilip Patel, Ramesh Kataria, Nayan Patel, Rajiv Shah and K. P. Mrudula for fruitful academic discussions.

Furthermore, I also convey my earnest gratefulness to the authorities of The Maharaja Sayajirao University of Baroda, Vadodara, for providing me with ample facilities for my research study.

I thank all my department colleagues Mr. Amar Mangrola, Mr. Anil Chavda, Mr. Nirav Dave, Ms. Nirati Bhadarka, Mr. Shardav Bhatt and Mr. Yash Sule for their constant support during my research work. I extend my gratitude to the office staff Mrs. Madhuri Wardy and Mrs. Pooja More for their cooperation to carry out the present research work. I am also thankful to the attendants of the department for their helping hands.

I am genuinely indebted to Dr. M. N. Patel, former Vice-Chancellor, Gujarat University, Ahmedabad for his blessing, continuous encouragement, and concern for having faith in my abilities for accomplishment of my Ph. D. work.

I extend my sincere thanks to Dr. A. M. Prabhakar, Principal, Government Engineering College, Modasa for making coducive work behaviour.

From the bottom of my heart, I would like to express special thanks to all my colleagues of Department of Science and Humanities, and Mr. Rambhai Patel, Office superitendent, Government Engineering College, Modasa for their honest support.

I extend my sincere thanks to all those persons who knowingly or unknowingly helped me to accomplish my research work.

Last but not least, I would like to thank my family members for all their love and encouragement. Above all, my loving, supportive, encouraging, and patient daughter Vagmi and son Ankit whose constant support made me to complete this long journey.

July 2017

Darshana A. Patel (M.Sc., M.Phil.)