Acknowledgement

At this very important juncture of my life, when I am writing this thesis, I feel that this work is not result of the hard work put in by me only, but it also took some remarkable contributions from many others. I would like to take this opportunity to acknowledge their contributions towards reaching this landmark of my life.

The first and foremost of all is The Guru, my guide Prof. Raju K. George who has put faith in my capabilities when I was a fresh graduate and agreed to be my Ph.D. guide. He has been always source of inspiration for me. Despite of his great knowledge in the subject and world wide recognition, he was always down to earth, always available and accessible for any academic discussions. I cannot forget the way he made me comfortable in self learning and understanding the subject which was completely new to me. His continuous encouragement has given me necessary impetus to pursue this work. It is not possible for me to quantify and describe my gratitude to him in words as it was not possible for me to complete this work without his support (academic and emotional), encouragement and constructive criticism which made me work hard.

The gist of the Sanskrit shloka

जननि जन्मभूमिश्च जाहनवीश्च जनार्दनः। जनकः पञ्चमश्चैव जकाराः पंच दुर्लेभाः॥

turned out to be true for me too. My Parents (Janani and Janak) put in lot of their efforts to follow my dreams. I would like to dedicate this work to them because without their continuous support and encouragement it was impossible for me to concentrate on my work and achieve whatever little I could. Though my father is not belonging to the same field as mine and my mother who is a home maker, both of them always extended all kinds of support and encouragement to purse my research.

I also take this opportunity to extend my deep sense of gratitude to my father-inlaw and mother-in-law who have been always kind enough to make me free from all social responsibilities so that I can concentrate on my work. My father-in-law, who is in the same profession has always been source of inspiration and encouragement for me. I also thank all other family members for extending their warmth and all possible support to me.

Any work of this kind takes lot of time and efforts and hence it is impossible to do it without support of your better half. I am really lucky to have understanding and caring husband like Raj(Pankaj) with me. He has not only shared all the social and household responsibilities with me so that I can concentrate on my work but also provided with me necessary ambiance and psychological boosts, whenever required, to be comfortable and focused all the time. I take this opportunity to extend my warm thanks to him.

I was lucky to be the second of the three children of my parents. I still remember the way my didi guided me to mold my career and the way my younger sister used to do most the work which gave me enough time to concentrate on my work. Both of them have always given me all kinds of support which was necessary at each stage of life which has given confidence and courage to me to take up this work and complete it. I extend my heartily thanks to them.

I really feel myself special when I look back and think about the teachers from whom I took my education and then worked with them. I am thankful to all the teachers of this department who later accepted me as their colleague. I have learned lot of things, not only in terms of academics but also about facing the life, from them for which I cannot thank them enough. I would like to specially thank Pathak sir for teaching us to be self confident and pursuing our goals till we achieve it and Ramamohan sir for teaching us importance of knowledge. It is difficult to quantify the help and the encouragement that I have got from Bankim sir, Vakaskar sir, Pragna Madam and Trupti Madam. They have all been very kind and supportive to me and continuously pushed me to put my maximum to achieve this goal. I sincerely thank all of them.

Friends and colleagues are the ones with whom we spent most of our time and hence they can influence our mind set and the research of this kind. I am lucky to have some very good friends and colleagues who made the work environment so healthy and lively that I never felt uncomfortable. They have always adjusted themselves so that I could do my work with maximum capacity. I would like to extend my special thanks to my tablemate and lovely friend Salma for bearing all my moods and still continue extending her warmth with her signature smile. Thanks to my classmate and a good friend, Jignesh, for extending his help whenever needed and solving all my doubts and problem related to computers and LATEX. His lively support also helped me, in facing the day to day difficulties. I also acknowledge the support I got from Archit, another classmate and a good friend of mine. His always smiling face and good sense of humor helped me in learning how to be happy and concentrate on work in any situation. I am also grateful to Snehal sir, for his support with wisdom, Mitesh, Sheetal, Nikhil, Jenita and Bharat for sharing my teaching load in my critical time and always being nice to me and being ready to help in whatever

way possible.

I also extend my sincere thanks to the department of Applied Mathematics and all the Heads under whom I worked including our current head of the department Dr. Dhanesh Patel who always been kind enough to me in all my difficult situations and provided me with all necessary resources to do my research.

Last but not the least I would like to thank Faculty of Technology and Engineering and The M.S. University of Baroda for allowing me to be part of their eminent community. I also thank all the office staffs for being nice and supportive for my work.

Jaita P Sharma