This Ph.D. thesis is the result of a challenging journey, upon which many people have contributed and given their support. At the end of this journey, it is a pleasant task to express my thanks to all those people who made this thesis possible and an unforgettable experience for me.

Humble Pranams to our Chancellor and my beloved Satguru, Sri Mata Amritanandamayi Devi (AMMA), who has been a constant source of inspiration and the guiding light for all my endeavours. Her grace was instrumental in overcoming all the difficulties. My heart comes to my mouth as I record these lines to express my gratitude to her, who believes in the religion of love, caste of humanity and the language of the heart. I feel proud and fortunate to be a part of her institution, which has a mission to impart quality based education with ethics and values as its bedrock.

I take this opportunity to sincerely acknowledge the management of Amrita Vishwa Vidyapeetham for providing necessary infrastructure and resources which buttressed me to perform my work comfortably. A special thanks to the Director, Br. Dhanraj and the Associate Dean, Dr. S. G. Rakesh for sanctioning sabbatical leave for me, which aided in the completion of the documentation of my thesis on time.

This thesis is prepared under the supervision and guidance of Dr. K. V. Nagaraja, Professor, Dept. of Mathematics, Amrita School of Engineering. I am deeply indebted and sincerely grateful to him for his never failing guidance and encouragement. His passion towards learning through continuous reading and humble nature has always been an inspiration for me.

My special appreciations to Dr. H. T. Rathod, Professor, Dept. of Mathematics, Bangalore University, Dr. G. D. V. Gowda, Professor, T. I. F. R. Centre for Applicable Mathematics, Bangalore and Dr. Tarun Kant, Professor, Dept. of Civil Engineering, Indian Institute of Technology, Bombay, for their constructive suggestions and extensive discussions during my Comprehensive Viva-Voce and Open Seminar Examinations.

Many of the results obtained in this thesis have been published in referred journals. I owe a great deal of appreciation and gratitude to the learned referees of these international journals.
for their constructive comments on our published papers that helped us to refine them to the present form.

I am grateful to Dr. Pradeep G. Siddheshwar, Professor and Chair, Dept. of Mathematics, Bangalore University for his valuable advice.

I am extremely grateful to Dr. Nagaraj B. N., who was the Convenor of my Doctoral Committee initially, for his motivating and thought provoking questions. At the end of all the Doctoral Committee meetings, he always had an apt question, the answer for which would always become the next step in my research.

This thesis has been kept on track and been seen through to completion with the support of my Doctoral Committee members. I owe gratitude to my Doctoral Committee Convenor, Dr. S. G. Rakesh, Associate Dean and Chair PGP, Amrita School of Engineering, Bangalore. The credit of some of the colour pages in my thesis goes to him as he suggested me to plot the resultant quadrature points in the domain. I take this opportunity to also thank my other Doctoral Committee members, Dr. B. Venkatesh, Associate Professor and HOD, Dept. of Mathematics and Dr. Sangeeta K., Associate Professor, Dept. of Computer Science and Engineering for their helpful suggestions and comments during my progress report presentations.

The road to my Ph.D. started with a course work on Wavelets by Prof. K. V. V. Murthy, from whom more than the subject, I learned how to go about with the research and what a research scholar should look for. I am obliged to him for helping me in becoming a proper research person. I would also like to mention a special thank you, to all my Ph.D. Course Mentors, Prof. S. Bhargava, Dr. Sangeeta K., Dr. Shikha Tripathi, Dr. P. Anantha Lakshmi Narayana, Dr. Neetu Srivastava and Dr. Sukanya Saha.

I will forever be thankful to my post-graduation project guide, Dr. S. Kalpakam, Professor, Indian Institute of Technology, Madras. She was and remains my best role model for a mentor and a teacher. Her enthusiasm and love for teaching has always been my stimulus.

It is my pleasure to acknowledge my school teachers Ms. Sujatha, Ms. Sudha and my graduation teacher Ms. Anandavalli Ammal for their motivation. It was their efforts which instilled in me deep interest in the subject of preciseness, Mathematics.

My heartfelt appreciations to Dr. V. Kesavulu Naidu, for his timely help, support and constant encouragement. It is my pleasure to acknowledge the HOD of my department, Dr. B.
Venkatesh and other colleagues Mr. Murali, Ms. Meera, Ms. Geetha, Dr. Deepa Gupta, Dr. Jaya Shree and Ms. Mamatha for their co-operation and support.

I warmly thank Mr. C. M. Gopalakrishna for his timely advice and moral support. I extend my thanks to my spiritual reading class friends, Dr. Dhanesh Kurup, Prof. Baldevraj, Mr. Kesavan and Major Braj Bhushan Jha. These classes have helped me in keeping my mind calm.

I have always been blessed with magnificent friends in my life, who kept me going by providing a stimulating and fun filled environment. Words are short to express my gratitude towards my following friends, Ms. Deepthi Manoj, Ms. Sangeetha Vasudevan, Ms. Shibani C. Aich, Ms. Shali S., Ms. Beena Nair, Ms. Jyotsna G. S., Ms. Deepthi J., Ms. Smita Sail, Ms. Paromita Ganguly, Ms. Smita Singh, Ms. Ruhhi Bhaveja, Ms. Deepa Kumari, Ms. Sheeba Shameer, Ms. Nytha Anish, Ms. Harshada Thakur and Ms. Sowmya Saji for providing me moral support whenever I required, either directly or indirectly.

At this moment of accomplishment, I would like to pay homage to my grandmother Late Subhadra Nessiar. I would not have reached this stage in my life without her blessings and encouragement.

The biggest support, motivation and encouragement for a girl, from childhood emanate from her parents, especially her father. My father has always given me the courage to dream and try to fulfil challenging dreams and my mother has always taught me the importance of being patient and humble in all stages of life. Thank you doesn’t seem sufficient but it is said with appreciation and respect to my parents, Mr. P. U. Achuthanand Menon and Ms. Geetha Kaveri Nessiar for their support, care, love, motivation, understanding and prayers. I would also like to extend a huge loving thanks to my sweet sister Ms. Subhadra V. K. for her love and prayers.

I feel fortunate to have an understanding mother-in-law who supported me equally like my mother, during the course of my Ph.D. I am ever indebted to my mother-in-law Ms. Vimalambika and her elder sister Ms. Chandramathi for their unconditional support.

My special acknowledgement to my aunt, Ms. Parvathy Devi Nessiar for her timely help and care and all my relatives and family friends for their good wishes and moral support.

My thanks are due to the medical surgeons Dr. Beena Jaysingh and Dr. Sidharth Mishra who saved my life from the fatal Peritonitis, with which I was suffering during the course of my Ph.D. work.
Last but not the least I would like to pay high regards to my husband, Mr. Jayan Balanathan, for his sincere encouragement throughout my research work and lifting me uphill this phase of life. He always understood my anxieties and worries and stood beside me in every stage of life. He helped me in learning JAVA programming, which I used as a tool in my work to evaluate results and also helped me in proof-reading of the document. I owe everything to him.

I express my thanks to my beloved sons Master Anirudh and Master Bhuvanesh for their love and co-operation.

Besides this, I would like to extend my gratitude to one and all who have knowingly or unknowingly, directly or indirectly helped me in the successful completion of this work.

Sarada Jayan