## Acknowledgements

This dissertation is the culmination of my long journey of Ph.D. which was just like climbing a high peak step by step accompanied with hardship, encouragement, frustration and trust. Only my name appears on the cover page of this thesis but it has been completed with encouragement, support and efforts of numerous people including my friends, well-wishers, family members, relatives and supervisor.

It is a great pleasure for me to express my respect and deepest gratitude to my Ph.D. supervisor Dr. Sunil Kumar, Assistant Professor, Department of Mathematical Sciences, Indian Institute of Technology (BHU), Varanasi, for his guidance, sagacity, expertness, zealous involvement and tenacious encouragement during the planning and development of this research work. I thankfully acknowledge his painstaking efforts to improve the manuscripts without which this research work could not have been finished.

Besides my supervisor, I would like to express my deep sense of gratitude to the rest of my RPEC (Research Progress Evaluation Committee) members Dr. Swasti Sundar Mandal and Dr. Rajesh Kumar Pandey, for their time, suggestions and encouragement. I owe my special thanks to Prof. T. Som, Head and Prof. L. P. Singh, former Head, Department of Mathematical Sciences, IIT (BHU) for providing necessary facilities, help for carring out the research work. I am deeply grateful to all faculty members of Department of Mathematical Sciences IIT (BHU), for their assistance and support. I am also greatly indebted to staff members of the department, for their cooperation and help throughout my research tenure.

I am highly obliged to Prof. Ajay K Sharma, former Director, National Institute of Technology, Delhi for providing me NOC to continue the research with Dr. Sunil Kumar, as he moved from NIT Delhi to IIT (BHU). I acknowledge my sincere gratitude to Dr. Gyanendra Sheoran, Head and Dr. Anuj Kumar Sharma, former Head, all faculty members, all non-teaching staffs of the Department of Applied Sciences, NIT Delhi for providing me the necessary facilities for carring out the research work during my stay from August, 2015 to July 2017. I gratefully acknowledge the helps that I received from Dr. Prashant Kumar, who was my internal supervisor at NIT Delhi (from December, 2016 to July, 2017).

Special thanks to Council of Scientific and Industrial Research (CSIR), Govt. of India, New Delhi, for providing me the research fellowship during the Ph.D. program. I would also like to express my deepest gratitude to Science and Engineering Research Board, Department of Science and Technology, Govt. of India, New Delhi and Indian Institute of Technology (BHU), Varanasi, India, for providing me the financial support to attend Seventh Conference on Finite Difference Methods: Theory and Applications in Bulgaria.

Throughout my career my parents Shri. Ramesh Singh and Smt. Kamla Devi, stood with me in all my ups and downs. Without them I would not have achieved anything. I am forever thankful for their