ACKNOWLEDGMENTS

In the name of Lord Shri Ganesha and Saint Shri Gajanan Maharaj, the most compassionate, the most merciful. This work would not have reached fruition without the help and support of many people. The research was both an adventure and a challenge, and the contributions of the following people are duly appreciated. First of all, I would like to thank my mother Mirabai Patil for her constant encouragement as a source of inspiration for my Ph.D. work.

Secondly, I am thankful to Professor Dr. Ravi M. Warkhedkar who has created the right environment for me to complete my Ph.D. Work. Further I am deeply indebted for his proactive supervision of my research work, effective guidance in writing this thesis, and his insightful comments, continuous encouragement and extensive assistance. He has always been available whenever I have needed support.

I would like to express my sincere thanks to Dr Ajeenkyay D Y Patil, Chancellor, Ajeenkyay D Y Patil University, Pune and Chairman Dr D Y Patil Educational Charitable Trust for opening constant encouragement towards acquiring the higher education and financial support. I am also thankful to Dr E. B Khedkar, Vice Chancellor, Ajeenkyay D Y Patil University, Pune, for continuous motivation towards the publications and constant support during my Ph.D. work. Further I am also thankful Dr. R. K. Shrivastava, Professor and Head of the Department of Mechanical Engineering, Government College of Engineering, Aurangabad, for guiding continuously during my course work and progress reports of my Ph.D. work.

I would also like to thank Dr. Uttam Kalwane and Shri. Sushant Patil for their constant support and motivation and guidance.

I am thankful to I would like to express my thanks to my wife Geeta and my children, Tejal, and Rushabh.

Finally, I would like to thank, my brother and sister, my nephews and the Patil family for extensive and continuous encouragement.

Patil Nitin Yashwant