Preface

Teaching with the help of figures is perhaps the oldest and the most effective way a teacher could follow to explain things clearly to his students, or to clarify their doubts. Computers have greatly enhanced the learning process by providing simple graphical representations of the theoretical aspects of a subject. The success of an educational software depends on how simply it is able to present (mostly in terms of figures) the topics it is meant to teach. This in turn is possible only if the various aspects of the subject have been conceptualized and visualized in an effective manner. The advent of multimedia and other graphic oriented systems has been a blessing to those interested in the development of visualization programs. The significance of the deeper aspects of computer science and higher mathematics is indeed intriguing to a curious researcher. This combined with the possibility of taking it to our engineers through visualization software together resulted into four years of work, the outcome is this thesis.

I would like to take this opportunity to express my sincere gratitude to my supervisor Prof. K. K. Nambiar for having generously poured out his knowledge and experience to me. Working with him has been an enjoyable learning process which I will always cherish. His affectionate guidance during thesis work and on other matters have been invaluable. My admiration for his concise and powerful language is great and I hope I have picked up at least a little of his style of presentation.

I am grateful to the Dean, Prof. R. G. Gupta, for his whole hearted support. I thank him for allowing us the use of the hardware lab. I express my gratitude to all the academic and nonacademic staff of our school for their constant support. Robin needs special mention for providing a regular supply of tea.

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The love and faith of my parents have been my strength throughout my life and I dedicate this thesis to them as a tribute to what they mean to me. The love of my younger brother Prajod has been my asset and I am grateful for his affectionate criticism. I am thankful also to the love of my sisters Bhavana and Neema which has been my side always.

Before I end, a word about typesetting and conventions. We have tried to make the presentation of the thesis as simple as possible. To maintain continuity we have reduced cross referencing between sections and chapters most of the time. In this way we could also avoid numbering of formulas, equations, etc. For making the text less cluttered we have marked definitions by bullets (●) and results by stars (★). This thesis could not have been produced in its present form if it hadn’t been for TeX. Thanks to Knuth for having created it, and thanks once again to my supervisor for having introduced us to TeX. Here I would also like to thank our friend H. S. Dagar who provided us with EmTEX and helped in setting it up in our system. The TeX macros that we wrote made the typesetting job much easier. Finally, thanks again to all who helped me, but I alone am responsible for any errors in the thesis, technical or typesetting.

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- Pramod