

## PREFACE

This really is the golden age of Mathematics. It has been said that half the Mathematics ever created has been in the last 100 years and that half the mathematicians who have ever lived are alive today. We have seen such achievements as the resolution of the four-colour problem and Fermat's last theorem, with the latter being a special manifestation of a much more general result!

This book consists of chapters that deal with important topics in Biomathematics. A glance through any modern textbook or journal in the fields of ecology, genetics, physiology or biochemistry reveals that there has been an increasing use of mathematics, which ranges from the solution of complicated differential equation in population studies to the use of transfer functions in the analysis of eye-tracking mechanisms. This volume deals with Applied Mathematics in Biology and Medicine and is concerned with applied mathematical models and computer simulation in the areas of Molecular and Cellular Biology, Biological Soft Tissues and Structures as well as Bioengineering.

In this volume an attempt has been made to cover biological background and mathematical techniques whenever required. The aim has been to formulate various mathematical models on a fairly general platform, making the biological assumptions quite explicit and to perform the analysis in relatively rigorous terms. I hope, the choice and treatment of the problems will enable the readers to understand and evaluate detailed analyses of specific models and applications in the literature.

The purpose of bringing out this volume on Biomathematics dealing with interdisciplinary topics has been twofold. The objectives are to promote research in applied mathematical problems of the life sciences and to enhance cooperation and exchanges between mathematical scientists, biologists and medical researchers. This volume has both a synthetic and

analytic effect. The different chapters of the volume have been mostly concerned with model building and verification in different areas of biology and the medical sciences.

I believe people in the entire spectrum of those with interest in ecology, from field biologists seeking a conceptual framework for their observations to mathematicians seeking fruitful areas of application, will find stimulation here. It may so happen that some readers may find some parts of this volume trivial and some of the parts incomprehensible. Keeping this in view the extensive bibliographies given at the end of each chapter do attempt to provide an entry to the corresponding areas of study.

For over 35 years I have been engaged in teaching and research at several well-known institutions of India, Germany and North America. Publication of the series of books has been the fruit of a long period of collaboration together with relentless perseverance. My labour will be deemed amply rewarded if at least some of those for whom the book is meant derive benefit from it.

I feel highly indebted to the contributors of this volume who have so kindly accepted my invitation to contribute chapters. The enormous pleasure and enthusiasm with which they have accepted my invitation have touched me deeply, boosting my interest in the publication of the book.

I constantly remember the extent of care my parents have taken to impart proper education to me. I am highly indebted to Srimat Swami Shankaranandaji Maharaj, seventh President of the Ramakrishna Math and the Ramakrishna Mission, Belur Math, Swami Tejasanandaji and Swami Gokulanandaji, the then Principal and Vice-Principal of the Ramakrishna Mission Vidyamandira, Belur Math and to the monastic members of the Ramakrishna Mission Calcutta Students' Home, Belgharia for their kind guidance and suggestions and for instilling in me, while I was still a college and university student, a deep sense of total involvement in pursuing academic goals and a strong commitment to human values.

It is a pleasure to acknowledge the moral support, help and encouragement that I have been receiving constantly in all my academic activities from my wife Shorasi and my children Subhas, Sumita and Sudip.

I.I.T. Kharagpur

J. C. Misra

January, 2005