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Mathematical Systems Theory in Biology, Communications, Computation, and Finance

With 66 Illustrations

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FOREWORD

This IMA Volume in Mathematics and its Applications

MATHEMATICAL SYSTEMS THEORY IN BIOLOGY, COMMUNICATIONS, COMPUTATION, AND FINANCE

contains papers presented at the Fifteenth International Symposium on Mathematical Theory of Networks and Systems (MTNS) held on August 12-16, 2002 at the University of Notre Dame, an IMA Participating Institution. The conference was supported in part by the IMA through its affiliates program.

We would like to thank the organizers and all the participants for making the event successful. Joachim Rosenthal (Department of Mathematics, University of Notre Dame) and David S. Gilliam (Department of Mathematics and Statistics, Texas Tech University) did a superb job organizing this first-rate event and in editing these proceedings.

We also take this opportunity to thank the National Science Foundation for their support of the IMA.

Series Editors

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PREFACE

Mathematical systems theory is a vibrant research area encompassing a broad and diverse following. The theory impacts numerous application areas including aeronautics, biological systems, chemical engineering, communication systems, financial engineering and robotics to name just a very few.

This volume contains survey and research articles by leading researchers from around the world. The breadth and diversity of the works illustrate the far-reaching influence of mathematical systems theory. Many authors took special care so that their articles are self-contained and accessible also to non-specialists. The articles contained in this volume are based on plenary lectures, invited one hour lectures and minisymposia presented at the 15th International Symposium on the Mathematical Theory of Networks and Systems (MTNS 2002), held at the University of Notre Dame, August 12–16, 2002. These biennial international symposia traditionally cover areas involving a wide range of research directions in mathematical systems, networks and control theory, as well as, emerging research areas impacted by these areas. As might be expected, the mathematical methods employed in this work are equally wide-ranging, encompassing both the fields of pure and applied mathematics, with techniques from the modern theory of ordinary and partial differential equations, dynamical systems, real and complex analysis, numerical analysis, probability theory and stochastic analysis, operator theory, linear and commutative algebra as well as algebraic and differential geometry.

We wish to thank the authors and all contributors of MTNS 2002 for helping to make MTNS 2002 a success. MTNS 2002 had 420 registered participants. We also take great pleasure to thank Panos Antsaklis, Harriet Baldwin, Patricia V. Brick, Steven Buechler, Jeffrey Kantor, Christopher Monico, Rebekka Rosenthal and Patti Strauch for their great help in different capacities. Finally we would like to formally acknowledge the generous financial support we received from the National Science Foundation, the Institute of Mathematics and its Applications in Minnesota and from several institutions at the University of Notre Dame.

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