PREFACE

The area of numerical analysis interacts with the area of control and systems theory in a number of ways, some of which are widely recognized and some of which are not fully appreciated or understood. Many of these topics were part of the presentations delivered at the 2000 International Symposium on the *Mathematical Theory of Networks and Systems, (MTNS 2000)* held in Perpignan, France. Several of these contributions are included in the papers in this volume.

This interaction between numerical analysis and control and systems theory including signal processing has been an increasingly important topic at the MTNS meetings. This is most appropriate given the history of the MTNS, which is a major conference in the general area of mathematical systems theory. It is usually organized every two years and traditionally covers areas involving a wide range of research directions in mathematical systems, networks and control theory. From its inception the MTNS has striven to be a "ridge" meeting between different areas. The symposium is interdisciplinary and attracts mathematicians, engineers and researchers working in all aspects of systems theory and networks as well as emerging fields in engineering and mathematics with a potential impact on automatic control systems and signal processing. Mathematical methods which play a role in the areas mentioned above stem from a broad range of fields of pure and applied mathematics, including ordinary and partial differential equations, real and complex analysis, numerical analysis, probability theory and stochastic analysis, operator theory, linear and commutative algebra as well as algebraic and differential geometry. There are a wide variety of applications considered at the MTNS. They range from problems in biology, communications and mathematical finance to problems in chemical engineering, aerospace engineering and robotics. The meeting in Perpignan, France, was the fourteenth MTNS.

The development of numerical methods for systems modeled by partial differential equations is an important topic which was much evident at MTNS 2000. However, papers on distributed parameter systems presented at MTNS 2000 will be included in the volume dedicated to *Distributed Parameter Systems and Operator Theory* in a different issue of this journal. In the present volume we will focus on problems related

to finite dimensional systems. The papers chosen for this volume provide a mix of survey and research papers as well as a nice introduction to several topics such as techniques for carrying out the theory, sensitivity and robustness, large scale systems, filtering and related problems, as well as systems theory and its impact on numerical analysis. The first paper provides a more detailed overview of the interaction between numerical analysis and systems theory, and of the works included in this special issue of the *International Journal of Applied Mathematics and Computer Science*.

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