

Preface

This special issue of the JOURNAL OF DYNAMIC SYSTEMS, MEASUREMENT, AND CONTROL is to commemorate the fiftieth anniversary of the Dynamic Systems and Control Division (DSCD) of ASME. Those of us that have been involved in these exciting decades have seen our activities play a key role in getting through several wars, the conquest of space, the growth of new industries, and the opening of new challenging opportunities for thousands of engineers. By taking a focussed view in this issue of the past half-century and a snapshot of the present status of the field, we hope that the articles written for this occasion will help point us into the next half-century.

This journal, and its predecessors, the *Transactions of the ASME* and the *ASME Journal of Basic Engineering*, have been a forum for many seminal papers in control and dynamic systems. These have covered a wide range of important topics including modeling, stability, linear quadratic Gaussian (LQG) control, etc. To highlight these contributions, we have chosen to start this issue with the abstract of a paper from fifty years ago that remains vital today. The Ziegler-Nichols paper on controller tuning was published in the November 1942 issue of the *Transactions of the ASME* and has had a lasting impact on control practice. We are also fortunate to be able to publish a new foreword to the paper, written by the authors, to give us a glimpse of the state of the control industry at that time and the context in which the original research was done.

The next grouping of three articles includes a fifty-year history of the division commissioned for this issue plus two different retrospective views of the impact of computers on control practice. These are followed by groupings of articles on key application areas in which automatic control has played a crucial role. Two are on physical system modeling, three deal with different aspects of the robotics field, four explore the diverse area of controls in manufacturing, and two treat the broad area of controls in transportation.

The remaining eleven papers deal with major developments in the theory and practice of automatic controls. They cover the landmark developments in our field as viewed by those who helped to promulgate them. The paper topics include: nonlinear system analysis and control, control of uncertain nonlinear systems, optimization of uncertain systems, adaptive control, learning control, intelligent control systems, digital tracking control, and, finally, four papers on recent theoretical developments concerning different aspects of uncertainty and robust control.

It is the hope of all of us who worked on this special issue that it will serve as a record which will be of lasting value for researchers interested in these topics, and of tutorial value to the student. To this end we encouraged the authors to develop extensive bibliographies where appropriate. We also suggested that the authors employ a first-person anecdotal narrative approach to address such questions as what initially attracted them to do research in their areas, what they see as the remaining challenges, and to inter-relate the accomplishments of others. We hope you will find this innovative approach illuminating.

This special issue was put together by a team of guest editors (David M. Auslander, Suhada Jayasuriya, Michael J. Rabins, and Masayoshi Tomizuka) chaired by Rabins. As in any effort of this kind, the list of authors, editors, reviewers, advisors, DSCD participants, and secretaries who should be acknowledged for their significant contributions is too long to be listed. Suffice it to say that our Controls Division has been well served by many individuals and is more than ever before a healthy participant in the world-wide controls community.

Chair, Guest Editors
Michael J. Rabins