

Preface



These special issues celebrate the 70th birthday of Professor Thomas Kailath, Hitachi America Professor of Engineering Emeritus, at Stanford University; and honor his remarkable career, with its notable contributions to many areas of research, teaching, university and professional service, and technology transfer through entrepreneurial ventures. The volumes bring together a collection of manuscripts that fall into five broad fields that are representative of his wide range of research interests, namely:

- Computation, linear algebra, and applied mathematics.
- Communication and information theory.
- Signal processing theory.
- Detection, estimation and filtering theories.
- Control and system theories.

Professor Kailath's research and teaching interests evolved gracefully with the times, emphasizing information theory and communications in the 1960s; linear systems, estimation and control in the 1970s; VLSI design and sensor array signal processing in the 1980s; and applications to semiconductor manufacturing and digital communications in the 1990s. In pursuing these mathematics-based engineering disciplines, he also found opportunities to contribute to several fields of mathematics, especially stochastic processes, operator theory and linear algebra. It is noteworthy that he achieved distinction and recognition in all these fields, for example winning outstanding paper prizes from the IEEE Transactions on Information Theory, the IEEE Transactions on Signal Processing, and the IEEE Transactions on Semiconductor Manufacturing, and being named a Distinguished Editor of the mathematical journals, *Linear Algebra and its Applications* and *Integral Equations and Operator Theory*. Professor Kailath proudly acknowledges that especially in later years these achievements were made possible by collaboration with a stellar array of over a hundred doctoral and postdoctoral students, many of whom went on to become outstanding in their fields; more than half are already IEEE Fellows and several are leaders in industry. In return, his students acknowledge the influence of his challenging and stimulating lectures, his wide knowledge, his incisive and relentless questioning and insistence on clarity, simplicity and physical understanding, and his support and encouragement to enter new areas of enquiry. To mark his seventieth birthday, several of them joined in endowing an annual Lecture and Colloquium at Stanford University to honor his influence and contributions. The first event was held June 9-10, 2005 (see <http://isl.stanford.edu/kailath>).

Professor Kailath served as President of the IEEE Information Theory Society in 1975, and received its Shannon Award in 2000. He has received the John R. Ragazzini Award of the American Control Council, the Technical Achievement and Society Awards of the IEEE Signal Processing Society, the IEEE Education Medal, the IEEE Donald G. Fink Prize Award, the first Stevin Medal of the Delft University

of Technology, a Golden Jubilee Medal of the IEEE Circuits and Systems Society, and an IEEE Millennium Medal. He has won Guggenheim, Churchill and Humboldt fellowships. Other major honors include Fellowships of the IEEE and of the Institute of Mathematical Statistics, and membership of the National Academy of Engineering, the National Academy of Sciences, the American Academy of Arts and Sciences, the Developing World Academy of Sciences, the Indian National Academy of Engineering and the Royal Spanish Academy of Engineering. Other bibliographic details can be found on his home page: <http://www.stanford.edu/~tkailath>.

Professor Kailath and his students have co-founded several high-technology companies, three of which went public: Integrated Systems, Inc., which was founded in 1980 and merged with WindRiver Systems in 1999; Numerical Technologies, Inc., founded in 1995 and acquired by Synopsis, Inc., in 2003; and Excess Bandwidth Corporation, founded in 1998, and acquired by Virata Corporation (now part of Conexant Corporation) in 2000. His latest venture is Clearshape Technologies, Inc., founded in May 2004.

The Guest Editors take this opportunity to dedicate this volume to Professor Kailath and to wish him and his family continued success and distinction. They also wish to thank the authors and the editorial staff of the journal and, in particular, the Editor-in-Chief Dr. Stephen Yau, for their assistance during the various stages of this work.

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