State Space And Multivariable Theory Studies In Dynamical Systems

This reference/text discusses the structure and concepts of multivariable control systems, offering a balanced presentation of theory, algorithm development, and methods of implementation.;The book contains a powerful software package - L.A.S (Linear Algebra and Systems) which provides a tool for verifying an analysis technique or control design.;Reviewing the fundamentals of linear algebra and system theory, Algorithms for Computer-Aided Design of Multivariable Control Systems: supplies a solid basis for understanding multivariable systems and their characteristics; highlights the most relevant mathematical developments while keeping proofs and detailed derivations to a minimum; emphasizes the use of computer algorithms; provides special sections of application problems and their solutions to enhance learning; presents a unified theory of linear multi-input, multi-output (MIMO) system models; and introduces new results based on pseudo-controllability and pseudo-observability indices, furnishing algorithms for more accurate internodel conversions.;Illustrated with figures, tables and display equations and containing many previously unpublished results, Algorithms for Computer-Aided Design of Multivariable Control Systems is a reference for electrical and electronics, mechanical and control engineers and systems analysts as well as a text for upper-level undergraduate, graduate and continuing-education courses in multivariable control.

This volume is a collection of chapters covering recent advances in stochastic optimal control theory and algebraic systems theory. The book will be a useful reference for researchers and graduate students in systems and control, algebraic systems theory, and applied mathematics. Requiring only knowledge of undergraduate-level control and systems theory, the work may be used as a supplementary textbook in a graduate course on optimal control or algebraic systems theory.

Design of Observer-based Compensators facilitates and adds transparency to design in the frequency domain which is not as well-established among control engineers as time domain design. The presentation of the design procedures starts with a review of the time domain results; therefore, the book also provides quick access to state space methods for control system design. Frequency domain design of observer-based compensators of all orders is covered. The design of decoupling and disturbance rejecting controllers is presented, and solutions are given to the linear quadratic and the model matching problems. The pole assignment design is facilitated by a new parametric approach in the frequency domain. Anti-windup control is also investigated in the framework of the polynomial approach. The discrete-time results for disturbance rejection and linear quadratic control are also presented. The book contains worked examples that can easily be reproduced by the reader, and the results are illustrated by simulations.

This book presents the basic concepts and recent developments of linear control problems with perturbations. The presentation concerns both continuous and discrete dynamical systems. It is self-contained and illustrated by numerous examples. From the contents: Notion of state observers Observability Observers of full-phase vectors for fully determined linear systems Functional observers for fully determined linear systems Asymptotic observers for linear systems with uncertainty Observers for bilinear and discrete systems

Realization and Modelling in System Theory

Theory and Application of Digital Control

Perspectives in Control Theory

Systems Theory with Engineering Applications

A Linear Systems Primer

This book provides a comprehensive treatment of the development and present state of the theory of sensitivity of dynamic systems. It is intended as a textbook and reference for researchers and scientists in electrical engineering, control and information theory as well as for mathematicians. The extensive and structured bibliography provides an overview of the literature in the field and points out directions for further research.

The past few decades have witnessed an increasing interest in the field of multidimensional systems theory. This is concerned with systems whose trajectories depend not on one single variable (usually interpreted as time or frequency), but on several independent variables, such as the coordinates of an image. The behavioural approach introduced by J. C. Willems provides a particularly suitable framework for developing a linear systems theory in several variables. The book deals with the classical concepts of autonomy, controllability, observability, and stabilizability. All the tests and criteria given are constructive in the sense that algorithmic versions may be implemented in modern computer algebra systems, using Gröbner basis techniques. There is a close connection between multidimensional systems theory and robust control of one-dimensional systems with several uncertain parameters. The central link consists in the basic tool of linear fractional transformations. The book concludes with examples from the theory of electrical networks.

About the book... The book provides an integrated treatment of continuous-time and discrete-time systems for two courses at postgraduate level, or one course at undergraduate and one course at postgraduate level. It covers mainly two areas of modern control theory, namely; system theory, and multivariable and optimal control. The coverage of the former is quite exhaustive while that of latter is adequate with significant provision of the necessary topics that enables a research student to comprehend various technical papers. The stress is on interdisciplinary nature of the subject. Practical control problems from various engineering disciplines have been drawn to illustrate the potential concepts. Most of the theoretical results have been presented in a manner suitable for digital computer programming along with the necessary algorithms for numerical computations.

This book aims to help the reader understand the linear continuous-time time-invariant dynamical systems theory and its importance for systems analysis and design of the systems operating in real conditions, i.e., in forced regimes under arbitrary initial conditions. The text completely covers IO, ISO and IIO systems. It introduces the concept of the system full matrix P(s) in the complex domain and establishes its link with the also newly introduced system full transfer function matrix F(s). The text establishes the full block diagram technique based on the use of F(s), which incorporates the Laplace transform of the input vector and the vector of all initial conditions. It explores the direct relationship between the system full transfer function matrix F(s) and the Lyapunov stability concept, definitions and conditions, as well as with the BI stability concept, definitions, and conditions. The goal of the book is to unify the study and applications of all three classes of the of the linear continuous-time time-invariant systems, for short systems.

The Wiener–Hopf Approach using Transforms and Spectral Factorization

Topics in Operator Theory and Interpolation

Proceedings of the Fourth IFAC International Symposium, Fredericton, Canada, 4-8 July 1977

Advances in Statistical Control, Algebraic Systems Theory, and Dynamic Systems Characteristics

Windup in Control

An Introduction

Recent results in the development and application of analysis and design techniques for the control of multivariable systems are discussed in this volume.

Theory and Application of Digital Control contains the proceedings of the IFAC Symposium held at New Delhi, India on January 5-7, 1982. This book particularly presents the texts of the five plenary talks and the 110 papers of the symposium. This book organizes the papers into 109 chapters, with nearly one-third of the papers focus on digital control, particularly, software and hardware of control using microcomputers; computer-aided design; and adaptive control and modeling for digital control. Another set of papers deal with several applications of digital control techniques in solving interesting problems of socio economic systems, electrical power systems, bio systems, and artificial satellites. The reader will benefit hugely from the topics in this book that span several important theoretical and applied areas of the fast-changing topic of digital control.

Over the past three decades R.E. Kalman has been one of the most influential personalities in system and control theory. His ideas have been instrumental in a variety of areas. This is a Festschrift honoring his 60th birthday. It contains contributions from leading researchers in the field giving an account of the profound influence of his ideas in a number of areas of active research in system and control theory. For example, since their introduction by Kalman in the early 60's, the concepts of controllability and observability of dynamical systems with inputs, have been the corner stone of the great majority of investigations in the field.

System Theory

Control and System Theory of Discrete-Time Stochastic Systems

Theory, Applications and Software

Its Effects and Their Prevention

Modern Control Engineering

A Tribute to Michael K. Sain

State Observers for Linear Systems with Uncertainty

This book demonstrates the newly developed Elementary Operations Algorithm (EOA). This is a systematic method for constructing a range of state-space realizations for 2-D systems. The key achievements of the monograph are as follows: - It provides a research-level introduction to the general area and undertakes a comparative critical review of previous approaches. - It gives a thorough coverage of the theoretical basis of the EOA algorithm. - It demonstrates the effectiveness of the EOA algorithm, for example, through the use of algebraic symbolic computing (using MAPLE), as well as by comparing this method with common alternatives.

The volume contains papers based on lectures delivered during the school "Per spectives in Control Theory" held in Sielpia, Poland on September 19-24, 1988. The aim of the school was to give the state-of-the-art presentation of recent achievements as weH as perspectives in such fields of control theory as optimal control and optimization, linear systems, and nonlinear systems. Accordingly, the volume includes survey papers together with presentations of some recent results. The special emphasis is put on: - nonlinear systems (algebraic and geometric methods), - optimal control and optimization (general problems, distributed parameter systems), - linear systems (linear-quadratic problem, robust stabilization). An important feature of the school (and consequently of the volume) was its really "international" character since it brought together leading control theoriests from West and East. All together the school was attended by 108 participants from 18 countries. During the school 21 one-hour invited lectures were delivered. Moreover, five half-an-hour talks were given and 30 contributions were presented in frames of poster sessions. The school was organized and supported by: Institute of Mathematics of the Polish Academy of Sciences, Committee of Automatic Control and Robotics of the Polish Academy of Sciences, - Institute of Automatic Control, Warsaw University of Technology (as Co ordinator of the Basic Research Program R.P.I.02 "Theory of Control of Continuous Dynamic Systems and Discrete Processes").

In this book, the author adopts a state space approach to time series modeling to provide a new, computer-oriented method for building models for vector-valued time series. This second edition has been completely reorganized and rewritten. Background material leading up to the two types of estimators of the state space models is collected and presented coherently in four consecutive chapters. New, fuller descriptions are given of state space models for autoregressive models commonly used in the econometric and statistical literature. Backward innovation models are newly introduced in this edition in addition to the forward innovation models, and both are used to construct instrumental variable estimators for the model matrices. Further new items in this edition include statistical properties of the two types of estimators, more details on multiplier analysis and identification of structural models using estimated models, incorporation of exogenous signals and choice of model size. A whole new chapter is devoted to modeling of integrated, nearly integrated and co-integrated time series.

"There are three words that characterize this work: thoroughness, completeness and clarity. The authors are congratulated for taking the time to write an excellent linear systems textbook!" —IEEE Transactions on Automatic Control Linear systems theory plays a broad and fundamental role in electrical, mechanical, chemical and aerospace engineering, communications, and signal processing. A thorough introduction to systems theory with emphasis on control is presented in this self-contained textbook, written for a challenging one-semester graduate course. A solutions manual is available to instructors upon adoption of the text. The book's flexible coverage and self-contained presentation also make it an excellent reference guide or self-study manual. For a treatment of linear systems that focuses primarily on the time-invariant case using streamlined presentation of the material with less formal and more intuitive proofs, please see the authors' companion book entitled A Linear Systems Primer.

Multivariable System Theory and Design

Advances in Theory and Applications

Linear Multivariable Control Systems

Contributions to Operator Theory and its Applications

Design of Observer-based Compensators

Proceedings of the Second IFAC Symposium West Lafayette, Indiana, USA, 15-17 September 1982

A Generalized Framework of Linear Multivariable Control proposes a number of generalized models by using the generalized inverse of matrix, while the usual linear multivariable control theory relies on some regular models. The book supports that in H-infinity control, the linear fractional transformation formulation is relying on the inverse of the block matrix. If the block matrix is not regular, the H-infinity control does not apply any more in the normal framework. Therefore, it is very important to relax those restrictions to generalize the classical notions and models to include some non-regular cases. This book is ideal for scholars, academics, professional engineer and students who are interested in control system theory. Presents a comprehensive set of numerical procedures, algorithms, and examples on how to deal with irregular models Provides a summary on generalized framework of linear multivariable control that focuses on generalizations of models and notions Introduces a number of generalized models by using the generalized inverse of matrix

The state-space approach provides a formal framework where any result or procedure developed for a basic model can be seamlessly applied to a standard formulation written in state-space form. Moreover, it can accommodate with a reasonable effort nonstandard situations, such as observation errors, aggregation constraints, or missing in-sample values. Exploring the advantages of this approach, State-Space Methods for Time Series Analysis: Theory, Applications and Software presents many computational procedures that can be applied to a previously specified linear model in state-space form. After discussing the formulation of the state-space model, the book illustrates the flexibility of the state-space representation and covers the main state estimation algorithms: filtering and smoothing. It then shows how to compute the Gaussian likelihood for unknown coefficients in the state-space matrices of a given model before introducing subspace methods and their application. It also discusses signal extraction, describes two algorithms to obtain the VARMAX matrices corresponding to any linear state-space model, and addresses several issues relating to the aggregation and disaggregation of time series. The book concludes with a cross-sectional extension to the classical state-space formulation in order to accommodate longitudinal or panel data. Missing data is a common occurrence here, and the book explains imputation procedures necessary to treat missingness in both exogenous and endogenous variables. Web Resource The authors' E4 MATLAB® toolbox offers all the computational procedures, administrative and analytical functions, and related materials for time series analysis. This flexible, powerful, and free software tool enables readers to replicate the practical examples in the text and apply the procedures to their own work.

This book helps students, researchers, and practicing engineers to understand the theoretical framework of control and system theory for discrete-time stochastic systems so that they can then apply its principles to their own stochastic control systems and to the solution of control, filtering, and realization problems for such systems. Applications of the theory in the book include the control of ships, shock absorbers, traffic and communications networks, and power systems with fluctuating power flows. The focus of the book is a stochastic control system defined for a spectrum of probability distributions including Bernoulli, finite, Poisson, beta, gamma, and Gaussian distributions. The concepts of observability and controllability of a stochastic control system are defined and characterized. Each output process considered is, with respect to conditions, represented by a stochastic system called a stochastic realization. The existence of a control law is related to stochastic controllability while the existence of a filter system is related to stochastic observability. Stochastic control with partial observations is based on the existence of a stochastic realization of the filtration of the observed process.?

This book presents, in a rigorous and comprehensible way, the mathematical description and analysis of linear dynamic systems, and the controllability and observability of linear dynamic systems. It also details the stability of linear dynamic systems, automatic control systems, and nonlinear dynamic systems, and the optimal control of dynamic systems. The treatment is both systemic and synthetic, achieving rigorous and applicative solutions, and is illustrated with engineering examples. The book will appeal to scientists working in the practice of systems theory, engineering, automatic control, computer science, electrical engineering, electronics, and applied mathematics in biology and economics, as well as scientists working in education, research, design and industry.

Modern Control System Theory

State-Space Methods for Time Series Analysis

Proceedings of the International Symposium MTNS-89, Volume I

New Concepts and Tools

Multivariable Control

Essays dedicated to M. S. Livsic on the occasion of his 70th birthday

It is a great honor and privilege to have this opportunity of celebrating the 65th birthday of Professor Antonio Ruberti by holding an International Conference on Systems, Models and Feedback. The conference, and this volume which contains its proceedings, is a tribute to Professor Ruberti in acknowledgement of his major contributions to System Theory, at a time in which this area was emerging and consolidat ing as an independent discipline, his role as a leader of the Italian academic community, his activity in promoting and fostering close scientific relations between Italian and U.S. scholars in Systems and Control. The format of this conference is inspired by a series of seminars initi ated exactly twenty years ago under the direction of Professor Ruberti, in Italy, and Professor R. R. Mohler, in the U.S. By bringing together many authoritative talents from both countries, these seminars were instrumental in promoting the expansion of System Theory in new areas, notably that of Nonlinear Control, and were the key to successful scientific careers for many of the younger attendants.

"Illustrates the analysis, behavior, and design of linear control systems using classical, modern, and advanced control techniques. Covers recent methods in system identification and optimal, digital, adaptive, robust, and fuzzy control, as well as stability, controllability, observability, pole placement, state observers, input-output decoupling, and model matching."

This volume is dedicated to Tsuyoshi Ando, a foremost expert in operator theory, matrix theory, complex analysis, and their applications, on the occasion of his 60th birthday. The book opens with his biography and list of publications. It contains a selection of papers covering a broad spectrum of topics ranging from abstract operator theory to various concrete problems and applications. The majority of the papers deal with topics in modern operator theory and its applications. This volume also contains papers on interpolation and completion problems, factorization problems and problems connected with complex analysis. The book will appeal to a wide audience of pure and applied mathematicians.

Actuator saturation is probably the most frequent nonlinearity encountered in control applications. Input saturation leads to controller windup, removable by structural modification during compensator realization and plant windup which calls for additional dynamics. This book presents solutions to the windup prevention problem for stable and unstable single-input-single-output and multiple-input-multiple-output (MIMO) systems.

Linear Systems

The Influence of R. E. Kalman

Linear Continuous-Time Systems

Mechatronic System Control, Logic, and Data Acquisition

Algorithms for Computer-Aided Design of Multivariable Control Systems

From the Time to the Frequency Domain

State-space and Multivariable TheoryState-space and Multivariable TheoryLinear SystemsSpringer Science & Business Media

During the past decade the interaction between control theory and linear algebra has been ever increasing, giving rise to new results in both areas. As a natural outflow of this research, this book presents information on this interdisciplinary area. The cross-fertilization between control and linear algebra can be found in subfields such as Numerical Linear Algebra, Canonical Forms, Ring-theoretic Methods, Matrix Theory, and Robust Control. This book's editors were challenged to present the latest results in these areas and to find points of common interest. This volume reflects very nicely the interaction: the range of topics seems very wide indeed, but the basic problems and techniques are always closely connected. And the common denominator in all of this is, of course, linear algebra. This book is suitable for both mathematicians and students.

This book contains a derivation of the subset of stabilizing controllers for analog and digital linear time-invariant multivariable feedback control systems that insure stable system errors and stable controller outputs for persistent deterministic reference inputs that are trackable and for persistent deterministic disturbance inputs that are rejectable. For this subset of stabilizing controllers, the Wiener-Hopf methodology is then employed to obtain the optimal controller for which a quadratic performance measure is minimized. This is done for the completely general standard configuration and methods that enable the trading off of optimality for an improved stability margin and/or reduced sensitivity to plant model uncertainty are described. New and novel results on the optimal design of decoupled (non-interacting) systems are also presented. The results are applied in two examples: the one- and three-degree-of-freedom configurations. These demonstrate that the standard configuration is one encompassing all possible feedback configurations. Each chapter is completed by a group of worked examples, which reveal additional insights and extensions of the theory presented in the chapter. Three of the examples illustrate the application of the theory to two physical cases: the depth and pitch control of a submarine and the control of a Rosenbrock process. In the latter case, designs with and without decoupling are compared. This book provides researchers and graduate students working in feedback control with a valuable reference for Wiener–Hopf theory of multivariable design. Basic knowledge of linear systems and matrix theory is required.

Computer Aided Design of Multivariable Technological Systems covers the proceedings of the Second International Federation of Automatic Control (IFAC). The book reviews papers that discuss topics about the use of Computer Aided Design (CAD) in designing multivariable system, such as theoretical issues, applications, and implementations. The book tackles several topics relevant to the use of CAD in designing multivariable systems. Topics include quasi-classical approach to multivariable feedback system designs; fuzzy control for multivariable systems; root loci with multiple gain parameters; multivariable frequency domain stability criteria; and computational algorithms for pole assignment in linear multivariable systems. The text will be of great use to professionals whose work involves designing and implementing multivariable systems.

Perspectives in Mathematical System Theory, Control, and Signal Processing

A Generalized Framework of Linear Multivariable Control

Proceedings of the IFAC Symposium, New Delhi, India, 5-7 January 1982

Operator Theory, Operator Algebras, and Matrix Theory

Mathematical System Theory

A Festschrift in Honor of Yutaka Yamamoto on the Occasion of his 60th Birthday

This Festschrift, published on the occasion of the sixtieth birthday of Yutaka - mamoto (‘YY’ as he is occasionally casually referred to), contains a collection of articles by friends, colleagues, and former Ph.D. students of YY. They are a tribute to his friendship and his scienti?c vision and oeuvre, which has been a source of inspiration to the authors. Yutaka Yamamoto was born in Kyoto, Japan, on March 29, 1950. He studied applied mathematics and general engineering science at the Department of Applied Mathematics and Physics of Kyoto University, obtaining the B.S. and M.Sc. degrees in 1972 and 1974. His M.Sc. work was done under the supervision of Professor Yoshikazu Sawaragi. In 1974, he went to the Center for Mathematical System T- ory of the University of Florida in Gainesville. He obtained the M.Sc. and Ph.D. degrees, both in Mathematics, in 1976 and 1978, under the direction of Professor Rudolf Kalman.

The foundation of linear systems theory goes back to Newton and has been followed over the years by many improvements such as linear operator theory, Laplace Transformation etc. After the World War II, feedback control theory has shown a rapid development, and standard elegant analysis and synthesis techniques have been discovered by control system workers, such as root-locus (Evans) and frequency response methods (Nyquist, Bode). These permitted a fast and efficient analysis of simple-loop control systems, but in their original "paper-and-pencil" form were not appropriate for multiple loop high-order systems. The advent of fast digital computers, together with the development of multivariable multi-loop system techniques, have eliminated these difficulties.

Multivariable control theory has followed two main avenues; the optimal control approach, and the algebraic and frequency-domain control approach. An important key concept in the whole multivariable system theory is "ob servability and controllability" which revealed the exact relationships between transfer functions and the state variable representations. This has given new insight into the phenomenon of "hidden oscillations" and to the transfer function modelling of dynamic systems. The basic tool in optimal control theory is the celebrated matrix Riccati differential equation which provides the time-varying feedback gains in a linear-quadratic control system cell. Much theory presently exists for the characteristic properties and solution of this Riccati equation.

Based on a streamlined presentation of the authors’ successful work Linear Systems, this textbook provides an introduction to systems theory with an emphasis on control. Initial chapters present necessary mathematical background material for a fundamental understanding of the dynamical behavior of systems. Each chapter includes helpful chapter descriptions and guidelines for the reader, as well as summaries, notes, references, and exercises at the end. The emphasis throughout is on time-invariant systems, both continuous- and discrete-time.

Control and Dynamic Systems: Advances in Theory and Application, Volume 16 is concerned with applied dynamic systems control techniques. It describes various techniques for system modeling, which apply to several systems issues. This book presents a comprehensive treatment of powerful algorithmic techniques for solving dynamic-system optimization problems. It also describes approaches for systems model that apply to system issues such as time delays. The remaining chapters of this book explore the simulation of large closed-loop systems and optimization of low-order feedback controllers for discrete-time systems. Researchers who wish to broaden their understanding of dynamic systems control techniques will find this book invaluable.

State Space Modeling of Time Series

Systems, Models and Feedback: Theory and Applications

Multivariable Technological Systems

Computer Aided Design of Multivariable Technological Systems

Proceedings of the Sielpia Conference, Sielpia, Poland, September 19–24, 1988

Theory of Sensitivity in Dynamic Systems

This volume is the first of the three volume publication containing the proceedings of the 1989 International Symposium on the Mathematical Theory of Networks and Systems (MTNS-89), which was held in Amsterdam, The Netherlands, June 19-23, 1989. The International Symposia MTNS focus attention on problems from system and control theory, circuit theory and signal processing, which, in general, require application of sophisticated mathematical tools, such as from function and operator theory, linear algebra and matrix theory, interaction between advanced mathematical methods and practical engineering problems of circuits, systems and control, which is typical for MTNS, turns out to be most effective and is, as these proceedings show, a continuing source of exciting advances. The first volume contains invited papers and a large selection of other symposium presentations on the general theory of deterministic and stochastic systems with an emphasis on realization and modelling. A wide variety of recent results on approximate realization and system iden discrete event systems,- o systems, singular systems and nonstandard models IS presented. Preface vi Also a few papers on applications in hydrology and hydraulics are included. The titles of the two other volumes are: Robust Control of Linear Sys tems and Nonlinear Control (volume 2) and Signal Processing. Scatter ing and Operator Theory. and Numerical Methods (volume 3). The Editors are most grateful to the about 300 reviewers for their help in the refereeing process. The Editors thank Ms. G. Bijleveld and Ms.

A graduate text providing broad coverage of linear multivariable control systems, including several new results and recent approaches.

The first comprehensive and up-to-date reference on mechatronics, Robert Bishop's The Mechatronics Handbook was quickly embraced as the gold standard in the field. With updated coverage on all aspects of mechatronics, The Mechatronics Handbook, Second Edition is now available as a two-volume set. Each installment offers focused coverage of a particular area of mechatronics, supplying a convenient and flexible source of specific information. This seminal work is still the most exhaustive, state-of-the-art treatment of the field changing areas of mechatronics, this book discusses signals and systems control, computers, logic systems, software, and data acquisition. It begins with coverage of the role of control and the role modeling in mechatronic design, setting the stage for the more fundamental discussions on signals and systems. The volume reflects the profound impact the development of not just the computer, but the microcomputer, embedded computers, and associated information technologies and software advances. The final sections explore issue acquisition. Covers modern aspects of control design using optimization techniques from H2 theory Discusses the roles of adaptive and nonlinear control and neural networks and fuzzy systems Includes discussions of design optimization for mechatronic systems and real-time monitoring and control Focuses on computer hardware and associated issues of logic, communication, networking, architecture, fault analysis, embedded computers, and programmable logic controllers

This book consists of invited survey articles and research papers in the scientific areas of the “International Workshop on Operator Algebras, Operator Theory and Applications,” which was held in Lisbon in July 2016. Reflecting recent developments in the field of algebras of operators, operator theory and matrix theory, it particularly focuses on groupoid algebras and Fredholm conditions, algebras of approximation sequences, C* algebras of convolution type operators, index theorems, spectrum and numerical range of operators, extren quantum dynamics and operator algebras, and inverse eigenvalue problems. Establishing bridges between the three related areas of operator algebras, operator theory, and matrix theory, the book is aimed at researchers and graduate students who use results from these areas.

Design of Linear Multivariable Feedback Control Systems

State-space and Multivariable Theory

State-space Realisations of Linear 2-D Systems with Extensions to the General ND (n > 2) Case

Applied Mechanics Reviews

Proceedings of a U.S.-Italy Workshop in honor of Professor Antonio Ruberti, Capri, 15–17, June 1992
System Theory