

Nonlinear Systems Analysis Stability And Control Outline

GETTING THE BOOKS **NONLINEAR SYSTEMS ANALYSIS STABILITY AND CONTROL OUTLINE** NOW IS NOT TYPE OF INSPIRING MEANS. YOU COULD NOT LONELY GOING PAST BOOKS BUILDUP OR LIBRARY OR BORROWING FROM YOUR LINKS TO ENTRE THEM. THIS IS AN DEFINITELY SIMPLE MEANS TO SPECIFICALLY GET GUIDE BY ON-LINE. THIS ONLINE PROCLAMATION **NONLINEAR SYSTEMS ANALYSIS STABILITY AND CONTROL OUTLINE** CAN BE ONE OF THE OPTIONS TO ACCOMPANY YOU LATER THAN HAVING EXTRA TIME.

IT WILL NOT WASTE YOUR TIME. SAY YES ME, THE E-BOOK WILL UTTERLY AERATE YOU NEW ISSUE TO READ. JUST INVEST LITTLE TIME TO RETRIEVE THIS ON-LINE REVELATION **NONLINEAR SYSTEMS ANALYSIS STABILITY AND CONTROL OUTLINE** AS COMPETENTLY AS EVALUATION THEM WHEREVER YOU ARE NOW.

FINITE-TIME STABILITY: AN INPUT-OUTPUT APPROACH FRANCESCO AMATO 2018-08-01 SYSTEMATICALLY PRESENTS THE INPUT-OUTPUT FINITE-TIME STABILITY (IO-FTS) ANALYSIS OF DYNAMICAL SYSTEMS, COVERING ISSUES OF ANALYSIS, DESIGN AND ROBUSTNESS THE INTEREST IN FINITE-TIME CONTROL HAS CONTINUOUSLY GROWN IN THE LAST FIFTEEN YEARS. THIS BOOK SYSTEMATICALLY PRESENTS THE INPUT-OUTPUT FINITE-TIME STABILITY (IO-FTS) ANALYSIS OF DYNAMICAL SYSTEMS, WITH SPECIFIC REFERENCE TO LINEAR TIME-VARYING SYSTEMS AND HYBRID SYSTEMS. IT DISCUSSES ANALYSIS, DESIGN AND ROBUSTNESS ISSUES, AND INCLUDES APPLICATIONS TO REAL WORLD ENGINEERING PROBLEMS. WHILE CLASSICAL FTS HAS AN IMPORTANT THEORETICAL SIGNIFICANCE, IO-FTS IS A MORE PRACTICAL CONCEPT, WHICH IS MORE SUITABLE FOR REAL ENGINEERING APPLICATIONS, THE GOAL OF THE RESEARCH ON THIS TOPIC IN THE COMING YEARS. KEY FEATURES: INCLUDES APPLICATIONS TO REAL WORLD ENGINEERING PROBLEMS. INPUT-OUTPUT FINITE-TIME STABILITY (IO-FTS) IS A PRACTICAL CONCEPT, USEFUL TO STUDY THE BEHAVIOR OF A DYNAMICAL SYSTEM WITHIN A FINITE INTERVAL OF TIME. COMPUTATIONALLY TRACTABLE CONDITIONS ARE PROVIDED THAT RENDER THE TECHNIQUE APPLICABLE TO TIME-INVARIANT AS WELL AS TIME VARYING AND IMPULSIVE (I.E. SWITCHING) SYSTEMS. THE LMIS FORMULATION ALLOWS MIXING THE IO-FTS APPROACH WITH EXISTING CONTROL TECHNIQUES (E. G. H_2 CONTROL, OPTIMAL CONTROL, POLE PLACEMENT, ETC.). THIS BOOK IS ESSENTIAL READING FOR UNIVERSITY RESEARCHERS AS WELL AS POST-GRADUATE ENGINEERS PRACTICING IN THE FIELD OF ROBUST PROCESS CONTROL IN RESEARCH CENTERS AND INDUSTRIES. TOPICS DEALT WITH IN THE BOOK COULD ALSO BE TAUGHT AT THE LEVEL OF ADVANCED CONTROL COURSES FOR GRADUATE STUDENTS IN THE DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING, MECHANICAL ENGINEERING, AERONAUTICS AND ASTRONAUTICS, AND APPLIED MATHEMATICS.

NEURAL APPROXIMATIONS FOR OPTIMAL CONTROL AND DECISION RICCARDO ZOPPOLI 2019-12-17 NEURAL APPROXIMATIONS FOR OPTIMAL CONTROL AND DECISION PROVIDES A COMPREHENSIVE METHODOLOGY FOR THE APPROXIMATE SOLUTION OF FUNCTIONAL OPTIMIZATION PROBLEMS USING NEURAL NETWORKS AND OTHER NONLINEAR APPROXIMATORS WHERE THE USE OF TRADITIONAL OPTIMAL CONTROL TOOLS IS PROHIBITED BY COMPLICATING FACTORS LIKE NON-GAUSSIAN NOISE, STRONG NONLINEARITIES, LARGE DIMENSION OF STATE AND CONTROL VECTORS, ETC. FEATURES OF THE TEXT INCLUDE: • A GENERAL FUNCTIONAL OPTIMIZATION FRAMEWORK; • THOROUGH ILLUSTRATION OF RECENT THEORETICAL INSIGHTS INTO THE APPROXIMATE SOLUTIONS OF COMPLEX FUNCTIONAL OPTIMIZATION PROBLEMS; • COMPARISON OF CLASSICAL AND NEURAL-NETWORK BASED METHODS OF APPROXIMATE SOLUTION; • BOUNDS TO THE ERRORS OF APPROXIMATE SOLUTIONS; • SOLUTION ALGORITHMS FOR OPTIMAL CONTROL AND DECISION IN DETERMINISTIC OR STOCHASTIC ENVIRONMENTS WITH PERFECT OR IMPERFECT STATE MEASUREMENTS OVER A FINITE OR INFINITE TIME HORIZON AND WITH ONE DECISION MAKER OR SEVERAL; • APPLICATIONS OF CURRENT INTEREST: ROUTING IN COMMUNICATIONS NETWORKS, TRAFFIC CONTROL, WATER RESOURCE MANAGEMENT, ETC.; AND • NUMEROUS, NUMERICALLY DETAILED EXAMPLES. THE AUTHORS' DIVERSE BACKGROUNDS IN SYSTEMS AND CONTROL THEORY, APPROXIMATION THEORY, MACHINE LEARNING, AND OPERATIONS RESEARCH LEND THE BOOK A RANGE OF EXPERTISE AND SUBJECT MATTER APPEALING TO ACADEMICS AND GRADUATE STUDENTS IN ANY OF THOSE DISCIPLINES TOGETHER WITH COMPUTER SCIENCE AND OTHER AREAS OF ENGINEERING.

NONLINEAR DYNAMICS AND CHAOS STEVEN H. STROGATZ 2018-05-04 THIS TEXTBOOK IS AIMED AT NEWCOMERS TO NONLINEAR DYNAMICS AND CHAOS, ESPECIALLY STUDENTS TAKING A FIRST COURSE IN THE SUBJECT. THE PRESENTATION STRESSES ANALYTICAL METHODS, CONCRETE EXAMPLES, AND GEOMETRIC INTUITION. THE THEORY IS DEVELOPED SYSTEMATICALLY, STARTING WITH FIRST-ORDER DIFFERENTIAL EQUATIONS AND THEIR BIFURCATIONS, FOLLOWED BY PHASE PLANE ANALYSIS, LIMIT CYCLES AND THEIR BIFURCATIONS, AND CULMINATING WITH THE LORENZ EQUATIONS, CHAOS, ITERATED MAPS, PERIOD DOUBLING, RENORMALIZATION,

FRACTALS, AND STRANGE ATTRACTORS.

NONLINEAR SYSTEMS P. G. DRAZIN 1992-06-26 THIS BOOK INTRODUCES THE MATHEMATICAL PROPERTIES OF NONLINEAR SYSTEMS, MOSTLY DIFFERENCE AND DIFFERENTIAL EQUATIONS, AS AN INTEGRATED THEORY, RATHER THAN PRESENTING ISOLATED FASHIONABLE TOPICS.

NONLINEAR SYSTEMS ANALYSIS M. VIDYASAGAR 2002-01-01 WHEN M. VIDYASAGAR WROTE THE FIRST EDITION OF NONLINEAR SYSTEMS ANALYSIS, MOST CONTROL THEORISTS CONSIDERED THE SUBJECT OF NONLINEAR SYSTEMS A MYSTERY. SINCE THEN, ADVANCES IN THE APPLICATION OF DIFFERENTIAL GEOMETRIC METHODS TO NONLINEAR ANALYSIS HAVE MATURED TO A STAGE WHERE EVERY CONTROL THEORIST NEEDS TO POSSESS KNOWLEDGE OF THE BASIC TECHNIQUES BECAUSE VIRTUALLY ALL PHYSICAL SYSTEMS ARE NONLINEAR IN NATURE. THE SECOND EDITION, NOW REPUBLISHED IN SIAM'S CLASSICS IN APPLIED MATHEMATICS SERIES, PROVIDES A RIGOROUS MATHEMATICAL ANALYSIS OF THE BEHAVIOR OF NONLINEAR CONTROL SYSTEMS UNDER A VARIETY OF SITUATIONS. IT DEVELOPS NONLINEAR GENERALIZATIONS OF A LARGE NUMBER OF TECHNIQUES AND METHODS WIDELY USED IN LINEAR CONTROL THEORY. THE BOOK CONTAINS THREE EXTENSIVE CHAPTERS DEVOTED TO THE KEY TOPICS OF LYAPUNOV STABILITY, INPUT-OUTPUT STABILITY, AND THE TREATMENT OF DIFFERENTIAL GEOMETRIC CONTROL THEORY. AUDIENCE: THIS TEXT IS DESIGNED FOR USE AT THE GRADUATE LEVEL IN THE AREA OF NONLINEAR SYSTEMS AND AS A RESOURCE FOR PROFESSIONAL RESEARCHERS AND PRACTITIONERS WORKING IN AREAS SUCH AS ROBOTICS, SPACECRAFT CONTROL, MOTOR CONTROL, AND POWER SYSTEMS.

NONLINEAR DYNAMICAL SYSTEMS AND CONTROL WASSIM M. HADDAD 2011-09-19 NONLINEAR DYNAMICAL SYSTEMS AND CONTROL PRESENTS AND DEVELOPS AN EXTENSIVE TREATMENT OF STABILITY ANALYSIS AND CONTROL DESIGN OF NONLINEAR DYNAMICAL SYSTEMS, WITH AN EMPHASIS ON LYAPUNOV-BASED METHODS. DYNAMICAL SYSTEM THEORY LIES AT THE HEART OF MATHEMATICAL SCIENCES AND ENGINEERING. THE APPLICATION OF DYNAMICAL SYSTEMS HAS CROSSED INTERDISCIPLINARY BOUNDARIES FROM CHEMISTRY TO BIOCHEMISTRY TO CHEMICAL KINETICS, FROM MEDICINE TO BIOLOGY TO POPULATION GENETICS, FROM ECONOMICS TO SOCIOLOGY TO PSYCHOLOGY, AND FROM PHYSICS TO MECHANICS TO ENGINEERING. THE INCREASINGLY COMPLEX NATURE OF ENGINEERING SYSTEMS REQUIRING FEEDBACK CONTROL TO OBTAIN A DESIRED SYSTEM BEHAVIOR ALSO GIVES RISE TO DYNAMICAL SYSTEMS. WASSIM HADDAD AND VIJAYSEKHAR CHELLABOINA PROVIDE AN EXHAUSTIVE TREATMENT OF NONLINEAR SYSTEMS THEORY AND CONTROL USING THE HIGHEST STANDARDS OF EXPOSITION AND RIGOR. THIS GRADUATE-LEVEL TEXTBOOK GOES WELL BEYOND STANDARD TREATMENTS BY DEVELOPING LYAPUNOV STABILITY THEORY, PARTIAL STABILITY, BOUNDEDNESS, INPUT-TO-STATE STABILITY, INPUT-OUTPUT STABILITY, FINITE-TIME STABILITY, SEMISTABILITY, STABILITY OF SETS AND PERIODIC ORBITS, AND STABILITY THEOREMS VIA VECTOR LYAPUNOV FUNCTIONS. A COMPLETE AND THOROUGH TREATMENT OF DISSIPATIVITY THEORY, ABSOLUTE STABILITY THEORY, STABILITY OF FEEDBACK SYSTEMS, OPTIMAL CONTROL, DISTURBANCE REJECTION CONTROL, AND ROBUST CONTROL FOR NONLINEAR DYNAMICAL SYSTEMS IS ALSO GIVEN. THIS BOOK IS AN INDISPENSABLE RESOURCE FOR APPLIED MATHEMATICIANS, DYNAMICAL SYSTEMS THEORISTS, CONTROL THEORISTS, AND ENGINEERS.

INTRODUCTION TO PROCESS CONTROL JOSE A. ROMAGNOLI 2016-04-19 INTRODUCTION TO PROCESS CONTROL, SECOND EDITION PROVIDES A BRIDGE BETWEEN THE TRADITIONAL VIEW OF PROCESS CONTROL AND THE CURRENT, EXPANDED ROLE BY BLENDING CONVENTIONAL TOPICS WITH A BROADER PERSPECTIVE OF MORE INTEGRATED PROCESS OPERATION, CONTROL, AND INFORMATION SYSTEMS. UPDATING AND EXPANDING THE CONTENT OF ITS PREDECESSOR, THIS SECOND EDITION

THE KOOPMAN OPERATOR IN SYSTEMS AND CONTROL ALEXANDRE MAUROY 2020-02-22 THIS BOOK PROVIDES A BROAD OVERVIEW OF STATE-OF-THE-ART RESEARCH AT THE INTERSECTION OF THE KOOPMAN OPERATOR THEORY AND CONTROL THEORY. IT ALSO REVIEWS NOVEL THEORETICAL RESULTS OBTAINED AND EFFICIENT NUMERICAL METHODS DEVELOPED WITHIN THE FRAMEWORK OF KOOPMAN OPERATOR THEORY. THE CONTRIBUTIONS DISCUSS THE LATEST FINDINGS AND TECHNIQUES IN SEVERAL AREAS OF CONTROL THEORY, INCLUDING MODEL PREDICTIVE CONTROL, OPTIMAL CONTROL, OBSERVER DESIGN, SYSTEMS IDENTIFICATION AND STRUCTURAL ANALYSIS OF CONTROLLED SYSTEMS, ADDRESSING BOTH THEORETICAL AND NUMERICAL ASPECTS AND PRESENTING OPEN RESEARCH DIRECTIONS, AS WELL AS DETAILED NUMERICAL SCHEMES AND DATA-DRIVEN METHODS. EACH CONTRIBUTION ADDRESSES A SPECIFIC PROBLEM. AFTER A BRIEF INTRODUCTION OF THE KOOPMAN OPERATOR FRAMEWORK, INCLUDING BASIC NOTIONS AND DEFINITIONS, THE BOOK EXPLORES NUMERICAL METHODS, SUCH AS THE DYNAMIC MODE DECOMPOSITION (DMD) ALGORITHM AND ARNOLDI-BASED METHODS, WHICH ARE USED TO REPRESENT THE OPERATOR IN A FINITE-DIMENSIONAL BASIS AND TO COMPUTE ITS SPECTRAL PROPERTIES FROM DATA. THE MAIN BODY OF THE BOOK IS DIVIDED INTO THREE PARTS: THEORETICAL RESULTS AND NUMERICAL TECHNIQUES FOR OBSERVER DESIGN, SYNTHESIS ANALYSIS, STABILITY ANALYSIS, PARAMETER ESTIMATION, AND IDENTIFICATION; DATA-DRIVEN TECHNIQUES BASED ON DMD, WHICH EXTRACT THE SPECTRAL PROPERTIES OF THE KOOPMAN OPERATOR FROM DATA FOR THE STRUCTURAL ANALYSIS OF CONTROLLED SYSTEMS; AND KOOPMAN OPERATOR TECHNIQUES WITH SPECIFIC APPLICATIONS IN SYSTEMS AND CONTROL, WHICH RANGE FROM HEAT TRANSFER ANALYSIS TO ROBOT CONTROL. A USEFUL REFERENCE RESOURCE ON THE KOOPMAN OPERATOR THEORY FOR CONTROL THEORISTS AND PRACTITIONERS, THE BOOK IS ALSO OF INTEREST TO GRADUATE

STUDENTS, RESEARCHERS, AND ENGINEERS LOOKING FOR AN INTRODUCTION TO A NOVEL AND COMPREHENSIVE APPROACH TO SYSTEMS AND CONTROL, FROM PURE THEORY TO DATA-DRIVEN METHODS.

NONLINEAR DYNAMICAL CONTROL SYSTEMS HENK NIJMEIJER 2013-03-14 THIS VOLUME DEALS WITH CONTROLLABILITY AND OBSERVABILITY PROPERTIES OF NONLINEAR SYSTEMS, AS WELL AS VARIOUS WAYS TO OBTAIN INPUT-OUTPUT REPRESENTATIONS. THE EMPHASIS IS ON FUNDAMENTAL NOTIONS AS (CONTROLLED) INVARIANT DISTRIBUTIONS AND SUBMANIFOLDS, TOGETHER WITH ALGORITHMS TO COMPUTE THE REQUIRED FEEDBACKS.

OPERATOR-BASED NONLINEAR CONTROL SYSTEMS MINGCONG DENG 2014-01-15 ENABLES READERS TO MASTER AND APPLY THE OPERATOR-THEORETIC APPROACH CONTROL OF NONLINEAR SYSTEMS IS A MULTIDISCIPLINARY FIELD INVOLVING ELECTRICAL ENGINEERING, COMPUTER SCIENCE, AND CONTROL ENGINEERING. SPECIFICALLY, THIS BOOK ADDRESSES UNCERTAIN NONLINEARITY. BEGINNING WITH HOW REAL PLANTS ARE MODELED AS OPERATOR-BASED PLANTS, THE AUTHOR DEVELOPS A SYSTEMATIC METHODOLOGY THAT ENABLES READERS TO UNDERSTAND A QUANTITATIVE STABILITY RESULT, A CRITICAL FACTOR IN ANY NONLINEAR CONTROL SYSTEM'S STABILITY AND PERFORMANCE. OPERATOR-BASED NONLINEAR CONTROL SYSTEMS: DESIGN AND APPLICATIONS FOCUSES ON THE OPERATOR-THEORETIC APPROACH, OFFERING DETAILED EXAMPLES ON HOW TO APPLY IT TO NETWORK CONTROLLED SYSTEMS. IN ADDITION TO CURRENT RESEARCH RESULTS, THE AUTHOR EXPLORES FUTURE RESEARCH DIRECTIONS AND APPLICATIONS OF THE OPERATOR-THEORETIC APPROACH. THE BOOK BEGINS WITH AN INTRODUCTION THAT DEFINES NONLINEAR SYSTEMS. NEXT, IT COVERS: ROBUST RIGHT COPRIME FACTORIZATION FOR NONLINEAR PLANTS WITH UNCERTAINTIES ROBUST STABILITY OF OPERATOR-BASED NONLINEAR CONTROL SYSTEMS TRACKING ISSUES AND FAULT DETECTION ISSUES IN NONLINEAR CONTROL SYSTEMS OPERATOR-BASED NONLINEAR CONTROL SYSTEMS WITH SMART ACTUATORS NONLINEAR FEEDBACK CONTROL FOR LARGE-SCALE SYSTEMS USING A DISTRIBUTED CONTROL SYSTEM DEVICE THROUGHOUT THE BOOK, DISCUSSIONS OF ACTUAL APPLICATIONS HELP READERS UNDERSTAND HOW THE OPERATOR-THEORETIC APPROACH WORKS IN PRACTICE. OPERATOR-BASED NONLINEAR CONTROL SYSTEMS IS RECOMMENDED FOR STUDENTS AND PROFESSIONALS IN CONTROL THEORY ENGINEERING AND APPLIED MATHEMATICS. WORKING WITH THIS EXPERTLY WRITTEN AND ORGANIZED BOOK, THEY WILL LEARN HOW TO OBTAIN ROBUST RIGHT COPRIME FACTORIZATION FOR MODELED PLANTS. MOREOVER, THEY WILL DISCOVER STATE-OF-THE-TECHNOLOGY RESEARCH RESULTS ON ROBUST STABILITY CONDITIONS AS WELL AS THE LATEST SYSTEM OUTPUT TRACKING AND FAULT DETECTION ISSUES THAT ARE CHALLENGING TODAY'S RESEARCHERS.

CONTROL OF NONLINEAR AND HYBRID PROCESS SYSTEMS PANAGIOTIS D. CHRISTOFIDES 2005-10-04 THIS MONOGRAPH PROVIDES INSIGHT AND FUNDAMENTAL UNDERSTANDING INTO THE FEEDBACK CONTROL OF NONLINEAR AND HYBRID PROCESS SYSTEMS. IT PRESENTS STATE-OF-THE-ART METHODS FOR THE SYNTHESIS OF NONLINEAR FEEDBACK CONTROLLERS FOR NONLINEAR AND HYBRID SYSTEMS WITH UNCERTAINTY, CONSTRAINTS AND TIME-DELAYS WITH NUMEROUS APPLICATIONS, ESPECIALLY TO CHEMICAL PROCESSES. IT COVERS BOTH STATE FEEDBACK AND OUTPUT FEEDBACK (INCLUDING STATE ESTIMATOR DESIGN) CONTROLLER DESIGNS. CONTROL OF NONLINEAR AND HYBRID PROCESS SYSTEMS INCLUDES NUMEROUS COMMENTS AND REMARKS PROVIDING INSIGHT AND FUNDAMENTAL UNDERSTANDING INTO THE FEEDBACK CONTROL OF NONLINEAR AND HYBRID SYSTEMS, AS WELL AS APPLICATIONS THAT DEMONSTRATE THE IMPLEMENTATION AND EFFECTIVENESS OF THE PRESENTED CONTROL METHODS. THE BOOK INCLUDES MANY DETAILED EXAMPLES WHICH CAN BE EASILY MODIFIED BY A CONTROL ENGINEER TO BE TAILORED TO A SPECIFIC APPLICATION. THIS BOOK IS USEFUL FOR RESEARCHERS IN CONTROL SYSTEMS THEORY, GRADUATE STUDENTS PURSUING THEIR DEGREE IN CONTROL SYSTEMS AND CONTROL ENGINEERS.

NONLINEAR CONTROL SYSTEMS HORACIO MARRUQUEZ 2003-04-25 PROVIDES COMPLETE COVERAGE OF BOTH THE LYAPUNOV AND INPUT-OUTPUT STABILITY THEORIES, IN A READABLE, CONCISE MANNER. * SUPPLIES AN INTRODUCTION TO THE POPULAR BACKSTEPPING APPROACH TO NONLINEAR CONTROL DESIGN * GIVES A THOROUGH DISCUSSION OF THE CONCEPT OF INPUT-TO-STATE STABILITY * INCLUDES A DISCUSSION OF THE FUNDAMENTALS OF FEEDBACK LINEARIZATION AND RELATED RESULTS. * DETAILS COMPLETE COVERAGE OF THE FUNDAMENTALS OF DISSIPATIVE SYSTEM'S THEORY AND ITS APPLICATION IN THE SO-CALLED L₂GAIN CONTROL PROBLEM, FOR THE FIRST TIME IN AN INTRODUCTORY LEVEL TEXTBOOK. * CONTAINS A THOROUGH DISCUSSION OF NONLINEAR OBSERVERS, A VERY IMPORTANT PROBLEM, NOT COMMONLY ENCOUNTERED IN TEXTBOOKS AT THIS LEVEL. * AN INSTRUCTOR'S MANUAL PRESENTING DETAILED SOLUTIONS TO ALL THE PROBLEMS IN THE BOOK IS AVAILABLE FROM THE WILEY EDITORIAL DEPARTMENT.

MULTIBODY DYNAMICS JEAN-CLAUDE SAMIN 2012-10-17 THIS VOLUME PROVIDES THE INTERNATIONAL MULTIBODY DYNAMICS COMMUNITY WITH AN UP-TO-DATE VIEW ON THE STATE OF THE ART IN THIS RAPIDLY GROWING FIELD OF RESEARCH WHICH NOW PLAYS A CENTRAL ROLE IN THE MODELING, ANALYSIS, SIMULATION AND OPTIMIZATION OF MECHANICAL SYSTEMS IN A VARIETY OF FIELDS AND FOR A WIDE RANGE OF INDUSTRIAL APPLICATIONS. THIS BOOK CONTAINS SELECTED CONTRIBUTIONS DELIVERED AT THE ECCOMAS THEMATIC CONFERENCE ON MULTIBODY DYNAMICS, WHICH WAS HELD IN BRUSSELS, BELGIUM AND ORGANIZED BY THE

UNIVERSITÉ CATHOLIQUE DE LOUVAIN, FROM 4TH TO 7TH JULY 2011. EACH PAPER REFLECTS THE STATE-OF-ART IN THE APPLICATION OF MULTIBODY DYNAMICS TO DIFFERENT AREAS OF ENGINEERING. THEY ARE ENLARGED AND REVISED VERSIONS OF THE COMMUNICATIONS, WHICH WERE ENHANCED IN TERMS OF SELF-CONTAINMENT AND TUTORIAL QUALITY BY THE AUTHORS. THE RESULT IS A COMPREHENSIVE TEXT THAT CONSTITUTES A VALUABLE REFERENCE FOR RESEARCHERS AND DESIGN ENGINEERS WHICH HELPS TO APPRAISE THE POTENTIAL FOR THE APPLICATION OF MULTIBODY DYNAMICS METHODOLOGIES TO A WIDE RANGE OF AREAS OF SCIENTIFIC AND ENGINEERING RELEVANCE.

INPUT-TO-STATE STABILITY ANDRII MIRONCHENKO 2022-12-14 INPUT-TO-STATE STABILITY PRESENTS THE DOMINATING STABILITY PARADIGM IN NONLINEAR CONTROL THEORY THAT REVOLUTIONIZED OUR VIEW ON STABILIZATION OF NONLINEAR SYSTEMS, DESIGN OF ROBUST NONLINEAR OBSERVERS, AND STABILITY OF NONLINEAR INTERCONNECTED CONTROL SYSTEMS. THE APPLICATIONS OF INPUT-TO-STATE STABILITY (ISS) ARE MANIFOLD AND INCLUDE MECHATRONICS, AEROSPACE ENGINEERING, AND SYSTEMS BIOLOGY. ALTHOUGH THE BOOK CONCENTRATES ON THE ISS THEORY OF FINITE-DIMENSIONAL SYSTEMS, IT EMPHASIZES THE IMPORTANCE OF A MORE GENERAL VIEW OF INFINITE-DIMENSIONAL ISS THEORY. THIS PERMITS THE ANALYSIS OF MORE GENERAL SYSTEM CLASSES AND PROVIDES NEW PERSPECTIVES ON AND A BETTER UNDERSTANDING OF THE CLASSICAL ISS THEORY FOR ORDINARY DIFFERENTIAL EQUATIONS (ODEs). FEATURES OF THE BOOK INCLUDE: • A COMPREHENSIVE OVERVIEW OF THE THEORETICAL BASIS OF ISS; • A DESCRIPTION OF THE CENTRAL APPLICATIONS OF ISS IN NONLINEAR CONTROL THEORY; • A DETAILED DISCUSSION OF THE ROLE OF SMALL-GAIN METHODS IN THE STABILITY OF NONLINEAR NETWORKS; AND • AN IN-DEPTH COMPARISON OF ISS FOR FINITE- AND INFINITE-DIMENSIONAL SYSTEMS. THE BOOK ALSO PROVIDES A SHORT OVERVIEW OF THE ISS THEORY FOR OTHER SYSTEMS CLASSES (PARTIAL DIFFERENTIAL EQUATIONS, HYBRID, IMPULSIVE, AND TIME-DELAY SYSTEMS) AND SURVEYS THE AVAILABLE RESULTS FOR THE IMPORTANT STABILITY PROPERTIES THAT ARE RELATED TO ISS. THE READER SHOULD HAVE A BASIC KNOWLEDGE OF ANALYSIS, LEBESGUE INTEGRATION THEORY, LINEAR ALGEBRA, AND THE THEORY OF ODEs BUT REQUIRES NO PRIOR KNOWLEDGE OF DYNAMICAL SYSTEMS OR STABILITY THEORY. THE AUTHOR INTRODUCES ALL THE NECESSARY IDEAS WITHIN THE BOOK. INPUT-TO-STATE STABILITY WILL INTEREST RESEARCHERS AND GRADUATE STUDENTS STUDYING NONLINEAR CONTROL FROM EITHER A MATHEMATICAL OR ENGINEERING BACKGROUND. IT IS INTENDED FOR ACTIVE READERS AND CONTAINS NUMEROUS EXERCISES OF VARYING DIFFICULTY, WHICH ARE INTEGRAL TO THE TEXT, COMPLEMENTING AND WIDENING THE MATERIAL DEVELOPED IN THE MONOGRAPH.

PID PASSIVITY-BASED CONTROL OF NONLINEAR SYSTEMS WITH APPLICATIONS ROMEO ORTEGA 2021-09-03 EXPLORE THE FOUNDATIONAL AND ADVANCED SUBJECTS ASSOCIATED WITH PROPORTIONAL-INTEGRAL-DERIVATIVE CONTROLLERS FROM LEADING AUTHORS IN THE FIELD IN PID PASSIVITY-BASED CONTROL OF NONLINEAR SYSTEMS WITH APPLICATIONS, EXPERT RESEARCHERS AND AUTHORS DRs. ROMEO ORTEGA, JOSE GUADALUPE ROMERO, PABLO BORJA, AND ALEJANDRO DONAIRE DELIVER A COMPREHENSIVE AND DETAILED DISCUSSION OF THE MOST CRUCIAL AND RELEVANT CONCEPTS IN THE ANALYSIS AND DESIGN OF PROPORTIONAL-INTEGRAL-DERIVATIVE CONTROLLERS USING PASSIVITY TECHNIQUES. THE ACCOMPLISHED AUTHORS PRESENT A FORMAL TREATMENT OF THE RECENT RESEARCH IN THE AREA AND OFFER READERS PRACTICAL APPLICATIONS OF THE DEVELOPED METHODS TO PHYSICAL SYSTEMS, INCLUDING ELECTRICAL, MECHANICAL, ELECTROMECHANICAL, POWER ELECTRONICS, AND PROCESS CONTROL. THE BOOK OFFERS THE MATERIAL WITH MINIMAL MATHEMATICAL BACKGROUND, MAKING IT RELEVANT TO A WIDE AUDIENCE. FAMILIARITY WITH THE THEORETICAL TOOLS REPORTED IN THE CONTROL SYSTEMS LITERATURE IS NOT NECESSARY TO UNDERSTAND THE CONCEPTS CONTAINED WITHIN. YOU'LL LEARN ABOUT A WIDE RANGE OF CONCEPTS, INCLUDING DISTURBANCE REJECTION VIA PID CONTROL, PID CONTROL OF MECHANICAL SYSTEMS, AND LYAPUNOV STABILITY OF PID CONTROLLERS. READERS WILL ALSO BENEFIT FROM THE INCLUSION OF: A THOROUGH INTRODUCTION TO A CLASS OF PHYSICAL SYSTEMS DESCRIBED IN THE PORT-HAMILTONIAN FORM AND A PRESENTATION OF THE SYSTEMATIC PROCEDURES TO DESIGN PID-PBC FOR THEM AN EXPLORATION OF THE APPLICATIONS TO ELECTRICAL, ELECTROMECHANICAL, AND PROCESS CONTROL SYSTEMS OF LYAPUNOV STABILITY OF PID CONTROLLERS PRACTICAL DISCUSSIONS OF THE REGULATION AND TRACKING OF BILINEAR SYSTEMS VIA PID CONTROL AND THEIR APPLICATION TO POWER ELECTRONICS AND THERMAL PROCESS CONTROL A CONCISE TREATMENT OF THE CHARACTERIZATION OF PASSIVE OUTPUTS, INCREMENTAL MODELS, AND PORT HAMILTONIAN AND EULER-LAGRANGE SYSTEMS PERFECT FOR SENIOR UNDERGRADUATE AND GRADUATE STUDENTS STUDYING CONTROL SYSTEMS, PID PASSIVITY-BASED CONTROL WILL ALSO EARN A PLACE IN THE LIBRARIES OF ENGINEERS WHO PRACTICE IN THIS AREA AND SEEK A ONE-STOP AND FULLY UPDATED REFERENCE ON THE SUBJECT.

SAFETY AND RELIABILITY: METHODOLOGY AND APPLICATIONS TOMASZ NOWAKOWSKI 2014-09-01 WITHIN THE LAST FIFTY YEARS THE PERFORMANCE REQUIREMENTS FOR TECHNICAL OBJECTS AND SYSTEMS WERE SUPPLEMENTED WITH: CUSTOMER EXPECTATIONS (QUALITY), ABILITIES TO PREVENT THE LOSS OF THE OBJECT PROPERTIES IN OPERATION TIME (RELIABILITY AND MAINTAINABILITY), PROTECTION AGAINST THE EFFECTS OF UNDESIRABLE EVENTS (SAFETY AND SECURITY) AND THE ABILITY TO

NONLINEAR DYNAMICAL SYSTEMS AND CONTROL WASSIM M. HADDAD 2008-02-17 THE APPLICATION OF DYNAMICAL SYSTEMS HAS CROSSED INTERDISCIPLINARY BOUNDARIES FROM CHEMISTRY TO BIOCHEMISTRY TO CHEMICAL KINETICS AND BEYOND. THIS BOOK

PRESENTS AND DEVELOPS A COMPLETE AND THOROUGH TREATMENT OF STABILITY ANALYSIS AND CONTROL DESIGN OF NONLINEAR DYNAMICAL SYSTEMS, WITH AN EMPHASIS ON LYAPUNOV-BASED METHODS.

INTRODUCTION TO NONLINEAR CONTROL CHRISTOPHER M. KELLETT 2023-06-27 AN INTRODUCTORY TEXT ON THE ANALYSIS, CONTROL, AND ESTIMATION OF NONLINEAR SYSTEMS, APPROPRIATE FOR ADVANCED UNDERGRADUATE AND GRADUATE STUDENTS THIS SELF-CONTAINED AND ACCESSIBLE INTRODUCTION TO THE CONCEPTS AND TECHNIQUES USED FOR NONLINEAR FEEDBACK SYSTEMS OFFERS A HOLISTIC TREATMENT SUITABLE FOR USE IN BOTH ADVANCED UNDERGRADUATE AND GRADUATE COURSES; STUDENTS NEED ONLY SOME FAMILIARITY WITH DIFFERENTIAL EQUATIONS AND LINEAR ALGEBRA TO UNDERSTAND THE MATERIAL PRESENTED. THE TEXT BEGINS WITH AN OVERVIEW OF STABILITY AND LYAPUNOV METHODS FOR NONLINEAR SYSTEMS, WITH LYAPUNOV'S SECOND METHOD REVISITED THROUGHOUT THE BOOK AS A CONNECTIVE THREAD. OTHER INTRODUCTORY CHAPTERS COVER LINEAR SYSTEMS, FREQUENCY DOMAIN METHODS, AND DISCRETE-TIME SYSTEMS. BUILDING ON THIS BACKGROUND MATERIAL, THE BOOK PROVIDES A BROAD INTRODUCTION TO THE BASIC IDEAS UNDERPINNING MAJOR THEMES OF RESEARCH IN NONLINEAR CONTROL, INCLUDING INPUT-TO-STATE STABILITY, SLIDING MODE CONTROL, ADAPTIVE CONTROL, FEEDBACK LINEARIZATION, AND ROBUST OUTPUT REGULATION. CHAPTERS ALSO COVER OBSERVER DESIGN AND ESTIMATION FOR NONLINEAR SYSTEMS. THE TEXT IS NOTABLE FOR ITS COVERAGE OF NONLINEAR MODEL PREDICTIVE CONTROL AND ITS INTRODUCTION TO THE USE OF LINEAR MATRIX INEQUALITIES AND SEMIDEFINITE PROGRAMMING COUPLED WITH THEIR USE IN MODERN ANTIWINDUP DESIGNS. * FIRST TEXT ON NONLINEAR CONTROL APPROPRIATE FOR UNDERGRADUATES * SUITABLE BOTH FOR STUDENTS PREPARING FOR RIGOROUS GRADUATE STUDY AND FOR THOSE ENTERING TECHNICAL FIELDS OUTSIDE OF ACADEMIA * UNIQUE IN ITS COVERAGE OF RECENT RESEARCH TOPICS * PEDAGOGICAL FEATURES INCLUDING EXTENSIVE CHAPTER SUMMARIES, EXAMPLES, AND APPENDICES WITH DEFINITIONS, RESULTS, AND MATLAB APPLICATIONS

ROBUST NONLINEAR CONTROL DESIGN RANDY FREEMAN 2008-01-11 THIS SOFTCOVER BOOK SUMMARIZES LYAPUNOV DESIGN TECHNIQUES FOR NONLINEAR SYSTEMS AND RAISES IMPORTANT ISSUES CONCERNING LARGE-SIGNAL ROBUSTNESS AND PERFORMANCE. THE AUTHORS HAVE BEEN THE FIRST TO ADDRESS SOME OF THESE ISSUES, AND THEY REPORT THEIR FINDINGS IN THIS TEXT. THE RESEARCHER WHO WISHES TO ENTER THE FIELD OF ROBUST NONLINEAR CONTROL COULD USE THIS BOOK AS A SOURCE OF NEW RESEARCH TOPICS. FOR THOSE ALREADY ACTIVE IN THE FIELD, THE BOOK MAY SERVE AS A REFERENCE TO A RECENT BODY OF SIGNIFICANT WORK. FINALLY, THE DESIGN ENGINEER FACED WITH A NONLINEAR CONTROL PROBLEM WILL BENEFIT FROM THE TECHNIQUES PRESENTED HERE.

NONLINEAR SYSTEMS HASSAN K. KHALIL 2013-11-01 FOR A FIRST-YEAR GRADUATE-LEVEL COURSE ON NONLINEAR SYSTEMS. IT MAY ALSO BE USED FOR SELF-STUDY OR REFERENCE BY ENGINEERS AND APPLIED MATHEMATICIANS. THE TEXT IS WRITTEN TO BUILD THE LEVEL OF MATHEMATICAL SOPHISTICATION FROM CHAPTER TO CHAPTER. IT HAS BEEN REORGANIZED INTO FOUR PARTS: BASIC ANALYSIS, ANALYSIS OF FEEDBACK SYSTEMS, ADVANCED ANALYSIS, AND NONLINEAR FEEDBACK CONTROL.

NONLINEAR CONTROL SYSTEMS II ALBERTO ISIDORI 1999-09-22 THIS EAGERLY AWAITED FOLLOW-UP TO NONLINEAR CONTROL SYSTEMS INCORPORATES RECENT ADVANCES IN THE DESIGN OF FEEDBACK LAWS, FOR THE PURPOSE OF GLOBALLY STABILIZING NONLINEAR SYSTEMS VIA STATE OR OUTPUT FEEDBACK. THE AUTHOR IS ONE OF THE MOST PROMINENT RESEARCHERS IN THE FIELD.

CONSTRUCTIVE NONLINEAR CONTROL R. SEPULCHRE 2012-12-06 CONSTRUCTIVE NONLINEAR CONTROL PRESENTS A BROAD REPERTOIRE OF CONSTRUCTIVE NONLINEAR DESIGNS NOT AVAILABLE IN OTHER WORKS BY WIDENING THE CLASS OF SYSTEMS AND DESIGN TOOLS. SEVERAL STREAMS OF NONLINEAR CONTROL THEORY ARE MERGED AND DIRECTED TOWARDS A CONSTRUCTIVE SOLUTION OF THE FEEDBACK STABILIZATION PROBLEM. ANALYSIS, GEOMETRIC AND ASYMPTOTIC CONCEPTS ARE ASSEMBLED AS DESIGN TOOLS FOR A WIDE VARIETY OF NONLINEAR PHENOMENA AND STRUCTURES. GEOMETRY SERVES AS A GUIDE FOR THE CONSTRUCTION OF DESIGN PROCEDURES WHILST ANALYSIS PROVIDES THE ROBUSTNESS WHICH GEOMETRY LACKS. NEW RECURSIVE DESIGNS REMOVE EARLIER RESTRICTIONS ON FEEDBACK PASSIVATION. RECURSIVE LYAPUNOV DESIGNS FOR FEEDBACK, FEEDFORWARD AND INTERLACED STRUCTURES RESULT IN FEEDBACK SYSTEMS WITH OPTIMALITY PROPERTIES AND STABILITY MARGINS. THE DESIGN-ORIENTED APPROACH WILL MAKE THIS WORK A VALUABLE TOOL FOR ALL THOSE WHO HAVE AN INTEREST IN CONTROL THEORY.

THE MEMS HANDBOOK MOHAMED GAD-EL-HAK 2001-09-27 THE REVOLUTION IS WELL UNDERWAY. OUR UNDERSTANDING AND UTILIZATION OF MICROELECTROMECHANICAL SYSTEMS (MEMS) ARE GROWING AT AN EXPLOSIVE RATE WITH A WORLDWIDE MARKET APPROACHING BILLIONS OF DOLLARS. IN TIME, MICRODEVICES WILL FILL THE NICHES OF OUR LIVES AS Pervasively AS ELECTRONICS DO RIGHT NOW. BUT IF THESE MINIATURE DEVICES ARE TO FULFILL THEIR MAMMOTH POTENTIAL, TODAY'S ENGINEERS NEED A THOROUGH GROUNDING IN THE UNDERLYING PHYSICS, MODELING TECHNIQUES, FABRICATION METHODS, AND MATERIALS OF MEMS. THE MEMS HANDBOOK DELIVERS ALL OF THIS AND MORE. ITS TEAM OF AUTHORS-UNSURPASSED IN THEIR EXPERIENCE AND STANDING IN THE SCIENTIFIC COMMUNITY- EXPLORE VARIOUS ASPECTS OF MEMS: THEIR DESIGN, FABRICATION, AND APPLICATIONS AS WELL AS THE PHYSICAL MODELING OF THEIR OPERATIONS. DESIGNED FOR MAXIMUM READABILITY WITHOUT COMPROMISING RIGOR, IT PROVIDES

A CURRENT AND ESSENTIAL OVERVIEW OF THIS FLEDGLING DISCIPLINE.

NONLINEAR SYSTEMS STABILITY ANALYSIS SEYED KAMALEDDIN YADAVAR NIKRAVESH 2018-09-03 THE EQUATIONS USED TO DESCRIBE DYNAMIC PROPERTIES OF PHYSICAL SYSTEMS ARE OFTEN NONLINEAR, AND IT IS RARELY POSSIBLE TO FIND THEIR SOLUTIONS. ALTHOUGH NUMERICAL SOLUTIONS ARE IMPRACTICAL AND GRAPHICAL TECHNIQUES ARE NOT USEFUL FOR MANY TYPES OF SYSTEMS, THERE ARE DIFFERENT THEOREMS AND METHODS THAT ARE USEFUL REGARDING QUALITATIVE PROPERTIES OF NONLINEAR SYSTEMS AND THEIR SOLUTIONS—SYSTEM STABILITY BEING THE MOST CRUCIAL PROPERTY. WITHOUT STABILITY, A SYSTEM WILL NOT HAVE VALUE. *NONLINEAR SYSTEMS STABILITY ANALYSIS: LYAPUNOV-BASED APPROACH* INTRODUCES ADVANCED TOOLS FOR STABILITY ANALYSIS OF NONLINEAR SYSTEMS. IT PRESENTS THE MOST RECENT PROGRESS IN STABILITY ANALYSIS AND PROVIDES A COMPLETE REVIEW OF THE DYNAMIC SYSTEMS STABILITY ANALYSIS METHODS USING LYAPUNOV APPROACHES. THE AUTHOR DISCUSSES STANDARD STABILITY TECHNIQUES, HIGHLIGHTING THEIR SHORTCOMINGS, AND ALSO DESCRIBES RECENT DEVELOPMENTS IN STABILITY ANALYSIS THAT CAN IMPROVE APPLICABILITY OF THE STANDARD METHODS. THE TEXT COVERS MOSTLY NEW TOPICS SUCH AS STABILITY OF HOMOGENOUS NONLINEAR SYSTEMS AND HIGHER ORDER LYAPUNOV FUNCTIONS DERIVATIVES FOR STABILITY ANALYSIS. IT ALSO ADDRESSES SPECIAL CLASSES OF NONLINEAR SYSTEMS INCLUDING TIME-DELAYED AND FUZZY SYSTEMS. PRESENTING NEW METHODS, THIS BOOK PROVIDES A NEARLY COMPLETE SET OF METHODS FOR CONSTRUCTING LYAPUNOV FUNCTIONS IN BOTH AUTONOMOUS AND NONAUTONOMOUS SYSTEMS, TOUCHING ON NEW TOPICS THAT OPEN UP NOVEL RESEARCH POSSIBILITIES. GATHERING A BODY OF RESEARCH INTO ONE VOLUME, THIS TEXT OFFERS INFORMATION TO HELP ENGINEERS DESIGN STABLE SYSTEMS USING PRACTICE-ORIENTED METHODS AND CAN BE USED FOR GRADUATE COURSES IN A RANGE OF ENGINEERING DISCIPLINES.

STABILITY ANALYSIS OF MARKOVIAN JUMP SYSTEMS YU KANG 2017-09-08 THIS BOOK FOCUSES ON THE STABILITY ANALYSIS OF MARKOVIAN JUMP SYSTEMS (MJSs) WITH VARIOUS SETTINGS AND DISCUSSES ITS APPLICATIONS IN SEVERAL DIFFERENT AREAS. IT ALSO PRESENTS GENERAL DEFINITIONS OF THE NECESSARY CONCEPTS AND AN OVERVIEW OF THE RECENT DEVELOPMENTS IN MJSs. FURTHER, IT ADDRESSES THE GENERAL ROBUST PROBLEM OF MARKOVIAN JUMP LINEAR SYSTEMS (MJLSs), THE ASYNCHRONOUS STABILITY OF A CLASS OF NONLINEAR SYSTEMS, THE ROBUST ADAPTIVE CONTROL SCHEME FOR A CLASS OF NONLINEAR UNCERTAIN MJSs, THE PRACTICAL STABILITY OF MJSs AND ITS APPLICATIONS AS A MODELLING TOOL FOR NETWORKED CONTROL SYSTEMS, MARKOVIAN-BASED CONTROL FOR WHEELED MOBILE MANIPULATORS AND THE JUMP-LINEAR-QUADRATIC (JLQ) PROBLEM OF A CLASS OF CONTINUOUS-TIME MJLSs. IT IS A VALUABLE RESOURCE FOR RESEARCHERS AND GRADUATE STUDENTS IN THE FIELD OF CONTROL THEORY AND ENGINEERING.

NONLINEAR SYSTEMS 2018-07-18 THIS BOOK FOCUSES ON SEVERAL KEY ASPECTS OF NONLINEAR SYSTEMS INCLUDING DYNAMIC MODELING, STATE ESTIMATION, AND STABILITY ANALYSIS. IT IS INTENDED TO PROVIDE A WIDE RANGE OF READERS IN APPLIED MATHEMATICS AND VARIOUS ENGINEERING DISCIPLINES AN EXCELLENT SURVEY OF RECENT STUDIES OF NONLINEAR SYSTEMS. WITH ITS THIRTEEN CHAPTERS, THE BOOK BRINGS TOGETHER IMPORTANT CONTRIBUTIONS FROM RENOWNED INTERNATIONAL RESEARCHERS TO PROVIDE AN EXCELLENT SURVEY OF RECENT STUDIES OF NONLINEAR SYSTEMS. THE FIRST SECTION CONSISTS OF EIGHT CHAPTERS THAT FOCUS ON NONLINEAR DYNAMIC MODELING AND ANALYSIS TECHNIQUES, WHILE THE NEXT SECTION IS COMPOSED OF FIVE CHAPTERS THAT CENTER ON STATE ESTIMATION METHODS AND STABILITY ANALYSIS FOR NONLINEAR SYSTEMS.

NONLINEAR CONTROL SYSTEMS ALBERTO ISIDORI 2013-04-17 THE PURPOSE OF THIS BOOK IS TO PRESENT A SELF-CONTAINED DESCRIPTION OF THE FUNDAMENTALS OF THE THEORY OF NONLINEAR CONTROL SYSTEMS, WITH SPECIAL EMPHASIS ON THE DIFFERENTIAL GEOMETRIC APPROACH. THE BOOK IS INTENDED AS A GRADUATE TEXT AS WELL AS A REFERENCE TO SCIENTISTS AND ENGINEERS INVOLVED IN THE ANALYSIS AND DESIGN OF FEEDBACK SYSTEMS. THE FIRST VERSION OF THIS BOOK WAS WRITTEN IN 1983, WHILE I WAS TEACHING AT THE DEPARTMENT OF SYSTEMS SCIENCE AND MATHEMATICS AT WASHINGTON UNIVERSITY IN ST. LOUIS. THIS NEW EDITION INTEGRATES MY SUBSEQUENT TEACHING EXPERIENCE GAINED AT THE UNIVERSITY OF ILLINOIS IN URBANA-CHAMPAIGN IN 1987, AT THE CARL-CRANZ GESELLSCHAFT IN OBERPFAFFENHOFEN IN 1987, AT THE UNIVERSITY OF CALIFORNIA IN BERKELEY IN 1988. IN ADDITION TO A MAJOR REARRANGEMENT OF THE LAST TWO CHAPTERS OF THE FIRST VERSION, THIS NEW EDITION INCORPORATES TWO ADDITIONAL CHAPTERS AT A MORE ELEMENTARY LEVEL AND AN EXPOSITION OF SOME RELEVANT RESEARCH FINDINGS WHICH HAVE OCCURRED SINCE 1985.

STABILITY IN NONLINEAR CONTROL SYSTEMS ALEKSANDR MIKHAILOVICH LETOV 2015-12-08 THE AUTHOR, A NOBEL PRIZE-WINNER, HAS ADDED TO THE AMERICAN TRANSLATION SEVERAL CHAPTERS NOT IN THE ORIGINAL. ORIGINALLY PUBLISHED IN 1961. THE PRINCETON LEGACY LIBRARY USES THE LATEST PRINT-ON-DEMAND TECHNOLOGY TO AGAIN MAKE AVAILABLE PREVIOUSLY OUT-OF-PRINT BOOKS FROM THE DISTINGUISHED BACKLIST OF PRINCETON UNIVERSITY PRESS. THESE EDITIONS PRESERVE THE ORIGINAL TEXTS OF THESE IMPORTANT BOOKS WHILE PRESENTING THEM IN DURABLE PAPERBACK AND HARDCOVER EDITIONS. THE GOAL OF THE PRINCETON LEGACY LIBRARY IS TO VASTLY INCREASE ACCESS TO THE RICH SCHOLARLY HERITAGE FOUND IN THE THOUSANDS OF BOOKS PUBLISHED BY PRINCETON UNIVERSITY PRESS SINCE ITS FOUNDING IN 1905.

CURRENT TRENDS IN NONLINEAR SYSTEMS AND CONTROL PETAR V. Kokotović 2006 THIS VOLUME IS AN OUTGROWTH OF THE WORKSHOP "APPLICATIONS OF ADVANCED CONTROL THEORY TO ROBOTICS AND AUTOMATION," ORGANIZED IN HONOR OF THE 70TH BIRTHDAYS OF PETAR V. Kokotović AND SALVATORE NICOSIA. BOTH PETAR AND TURI HAVE CARRIED OUT DISTINGUISHED WORK IN THE CONTROL COMMUNITY, AND HAVE LONG BEEN RECOGNIZED AS MENTORS AS WELL AS EXPERTS AND PIONEERS IN THE FIELD OF AUTOMATIC CONTROL, COVERING MANY TOPICS IN CONTROL THEORY AND SEVERAL DIFFERENT APPLICATIONS. THE VARIETY OF THEIR RESEARCH IS REFLECTED IN THIS BOOK, WHICH INCLUDES CONTRIBUTIONS RANGING FROM MATHEMATICS TO LABORATORY EXPERIMENTS. MAIN TOPICS COVERED INCLUDE: * OBSERVER DESIGN FOR TIME-DELAY SYSTEMS, NONLINEAR SYSTEMS, AND IDENTIFICATION FOR DIFFERENT CLASSES OF SYSTEMS * LYAPUNOV TOOLS FOR LINEAR DIFFERENTIAL INCLUSIONS, CONTROL OF CONSTRAINED SYSTEMS, AND FINITE-TIME STABILITY CONCEPTS * NEW STUDIES OF ROBOT MANIPULATORS, PARAMETER IDENTIFICATION, AND DIFFERENT CONTROL PROBLEMS FOR MOBILE ROBOTS * APPLICATIONS OF MODERN CONTROL TECHNIQUES TO PORT-CONTROLLED HAMILTONIAN SYSTEMS, DIFFERENT CLASSES OF VEHICLES, AND WEB HANDLING SYSTEMS * APPLICATIONS OF THE MAX-PLUS ALGEBRA TO SYSTEM-ORDER REDUCTION; OPTIMAL MACHINE SCHEDULING PROBLEMS; AND INVENTORY CONTROL WITH COOPERATION BETWEEN RETAILERS * CONTROL OF LINEAR AND NONLINEAR NETWORKED CONTROL SYSTEMS: DETERMINISTIC AND STOCHASTIC APPROACHES THE SCOPE OF THE WORK IS VERY BROAD, AND ALTHOUGH EACH CHAPTER IS SELF-CONTAINED, THE BOOK HAS BEEN ORGANIZED INTO THEMATICALLY RELATED CHAPTERS, WHICH IN SOME CASES SUGGEST TO THE READER A CONVENIENT READING SEQUENCE. THE GREAT VARIETY OF TOPICS COVERED AND THE ALMOST TUTORIAL WRITING STYLE USED BY MANY OF THE AUTHORS WILL MAKE THIS BOOK SUITABLE FOR EXPERTS, AS WELL AS YOUNG RESEARCHERS WHO SEEK A MORE INTUITIVE UNDERSTANDING OF THESE RELEVANT TOPICS IN THE FIELD.

EMERGENT BEHAVIOR DETECTION AND TASK COORDINATION FOR MULTIAGENT SYSTEMS JING WANG 2021-10-23 THIS BOOK ADDRESSES PROBLEMS IN THE MODELING, DETECTION, AND CONTROL OF EMERGENT BEHAVIORS AND TASK COORDINATION IN MULTIAGENT SYSTEMS. IT PRESENTS A UNIFIED SOLUTION TO SUCH PROBLEMS IN TERMS OF DISTRIBUTED ESTIMATION, DISTRIBUTED CONTROL, AND OPTIMIZATION OF INTERACTION TOPOLOGIES AND DYNAMICS. FOUR ASPECTS OF THE TECHNICAL SOLUTIONS IN THE BOOK ARE PRESENTED: FIRST, THE IMPACT OF INTERACTION DYNAMICS ON THE CONVERGENCE CONDITIONS RELATED TO INTERACTION TOPOLOGIES IS DISCUSSED, UTILIZING A DISCONTINUOUS COOPERATIVE CONTROL ALGORITHM OF UPDATED DESIGN. SECOND, DISTRIBUTED LEAST-SQUARES AND KALMAN FILTERING ALGORITHMS FOR AGENTS WITH LIMITED INTERACTIONS ARE ELABORATED UPON. THIRD, A GENERAL FRAMEWORK OF DISTRIBUTED NONLINEAR CONTROL IS ESTABLISHED, AND DISTRIBUTED ADAPTIVE CONTROL FOR NONLINEAR SYSTEMS WITH MORE GENERAL UNCERTAINTIES IS PRESENTED. BASED ON THE PROPOSED FRAMEWORK, A DISTRIBUTED NONLINEAR CONTROLLER IS DESIGNED TO DEAL WITH TASK COORDINATION OF ROBOTIC SYSTEMS WITH NONHOLONOMIC CONSTRAINTS. FINALLY, THE PROBLEM OF OPTIMAL MULTIAGENT TASK COORDINATION IS ADDRESSED AND SOLUTIONS BASED ON APPROXIMATE DYNAMIC PROGRAMMING AND APPROXIMATE DISTRIBUTED GRADIENT ESTIMATION ARE PRESENTED. *EMERGENT BEHAVIOR DETECTION AND TASK COORDINATION FOR MULTIAGENT SYSTEMS* IS OF INTEREST TO PRACTICING ENGINEERS IN AREAS SUCH AS ROBOTICS AND CYBER-PHYSICAL SYSTEMS, RESEARCHERS IN THE FIELD OF SYSTEMS, CONTROLS, AND ROBOTICS, AND SENIOR UNDERGRADUATE AND GRADUATE STUDENTS.

SYSTEMS MODELING AND COMPUTER SIMULATION NAIM KHEIR 2018-12-12 THIS SECOND EDITION DESCRIBES THE FUNDAMENTALS OF MODELLING AND SIMULATION OF CONTINUOUS-TIME, DISCRETE TIME, DISCRETE-EVENT AND LARGE-SCALE SYSTEMS. COVERAGE NEW TO THIS EDITION INCLUDES: A CHAPTER ON NON-LINEAR SYSTEMS ANALYSIS AND MODELLING, COMPLEMENTING THE TREATMENT OF OF CONTINUOUS-TIME AND DISCRETE-TIME SYSTEMS AND A CHAPTER ON THE COMPUTER ANIMATION AND VISUALIZATION OF DYNAMICAL SYSTEMS MOTION.

STABILITY AND STABILIZATION OF NONLINEAR SYSTEMS DIRK Aeyels 2008-01-26 THESE PAPERS WERE PRESENTED AT THE FIRST EC-TMR NONLINEAR CONTROL NETWORK WORKSHOP, ON STABILITY AND STABILIZATION OF NONLINEAR SYSTEMS, THAT TOOK PLACE IN MARCH 1999, GHENT, BELGIUM. THE TMR PROGRAMME OFFERS A UNIQUE OPPORTUNITY FOR THE ACADEMIC COMMUNITY TO EXPAND THEIR KNOWLEDGE, SHARE THEIR EXPERIENCE AND IDENTIFY AND DISCUSS STRATEGIC ISSUES IN ASPECTS OF NONLINEAR CONTROL ENGINEERING. THE AIM IS TO CREATE A RESOURCE CENTRE OF AVAILABLE EXPERTISE AND RESEARCH INTERESTS. THIS OUTSTANDING REFERENCE VOLUME PRESENTS CURRENT AND EMERGING RESEARCH DIRECTIONS, INCLUDING: STABILITY ANALYSIS OF NONLINEAR DYNAMICAL SYSTEMS AND CONVERSE LYAPUNOV THEOREMS; STABILIZATION AND REGULATION OF NONLINEAR DYNAMICAL CONTROL SYSTEMS; CONTROL OF PHYSICAL SYSTEMS USING PHYSICS-BASED LYAPUNOV FUNCTIONS AND PASSIVITY, AS WELL AS BIFURCATION ANALYSIS AND OPTIMAL CONTROL. THIS COLLECTION OF PEER-REVIEWED PAPERS PROVIDES A COMPREHENSIVE OVERVIEW OF THIS FIELD OF RESEARCH FOR GRADUATE STUDENTS AND RESEARCHERS IN ENGINEERING AND APPLIED MATHEMATICS.

ANALYSIS AND DESIGN OF NONLINEAR CONTROL SYSTEMS DAIZHAN CHENG 2011-03-28 "ANALYSIS AND DESIGN OF NONLINEAR CONTROL SYSTEMS" PROVIDES A COMPREHENSIVE AND UP TO DATE INTRODUCTION TO NONLINEAR CONTROL SYSTEMS, INCLUDING SYSTEM ANALYSIS AND MAJOR CONTROL DESIGN TECHNIQUES. THE BOOK IS SELF-CONTAINED, PROVIDING SUFFICIENT MATHEMATICAL

FOUNDATIONS FOR UNDERSTANDING THE CONTENTS OF EACH CHAPTER. SCIENTISTS AND ENGINEERS ENGAGED IN THE FIELD OF NONLINEAR CONTROL SYSTEMS WILL FIND IT AN EXTREMELY USEFUL HANDY REFERENCE BOOK. DR. DAIZHAN CHENG, A PROFESSOR AT INSTITUTE OF SYSTEMS SCIENCE, CHINESE ACADEMY OF SCIENCES, HAS BEEN WORKING ON THE CONTROL OF NONLINEAR SYSTEMS FOR OVER 30 YEARS AND IS CURRENTLY A FELLOW OF IEEE AND A FELLOW OF IFAC, HE IS ALSO THE CHAIRMAN OF TECHNICAL COMMITTEE ON CONTROL THEORY, CHINESE ASSOCIATION OF AUTOMATION.

ANALYSIS AND CONTROL OF NONLINEAR PROCESS SYSTEMS KATALIN M. HANGOS 2006-04-18 THIS STRAIGHTFORWARD TEXT MAKES THE COMPLICATED BUT POWERFUL METHODS OF NON-LINEAR CONTROL ACCESSIBLE TO PROCESS ENGINEERS. NOT ONLY DOES IT COVER THE NECESSARY MATHEMATICS, BUT IT CONSISTENTLY REFERS TO THE WIDELY-KNOWN FINITE-DIMENSIONAL LINEAR TIME-INVARIANT CONTINUOUS CASE AS A BASIS FOR EXTENSION TO THE NONLINEAR SITUATION.

SWITCHING IN SYSTEMS AND CONTROL DANIEL LIBERZON 2012-12-06 THE THEORY OF SWITCHED SYSTEMS IS RELATED TO THE STUDY OF HYBRID SYSTEMS, WHICH HAS GAINED ATTENTION FROM CONTROL THEORISTS, COMPUTER SCIENTISTS, AND PRACTICING ENGINEERS. THIS BOOK EXAMINES SWITCHED SYSTEMS FROM A CONTROL-THEORETIC PERSPECTIVE, FOCUSING ON STABILITY ANALYSIS AND CONTROL SYNTHESIS OF SYSTEMS THAT COMBINE CONTINUOUS DYNAMICS WITH SWITCHING EVENTS. IT INCLUDES A VAST BIBLIOGRAPHY AND A SECTION OF TECHNICAL AND HISTORICAL NOTES.

STABILITY ANALYSIS AND ROBUST CONTROL OF TIME-DELAY SYSTEMS MIN WU 2010-11-04 "STABILITY ANALYSIS AND ROBUST CONTROL OF TIME-DELAY SYSTEMS" FOCUSES ON ESSENTIAL ASPECTS OF THIS FIELD, INCLUDING THE STABILITY ANALYSIS, STABILIZATION, CONTROL DESIGN, AND FILTERING OF VARIOUS TIME-DELAY SYSTEMS. PRIMARILY BASED ON THE MOST RECENT RESEARCH, THIS MONOGRAPH PRESENTS ALL THE ABOVE AREAS USING A FREE-WEIGHTING MATRIX APPROACH FIRST DEVELOPED BY THE AUTHORS. THE EFFECTIVENESS OF THIS METHOD AND ITS ADVANTAGES OVER OTHER EXISTING ONES ARE PROVEN THEORETICALLY AND ILLUSTRATED BY MEANS OF VARIOUS EXAMPLES. THE BOOK WILL GIVE READERS AN OVERVIEW OF THE LATEST ADVANCES IN THIS ACTIVE RESEARCH AREA AND EQUIP THEM WITH A PIONEERING METHOD FOR STUDYING TIME-DELAY SYSTEMS. IT WILL BE OF SIGNIFICANT INTEREST TO RESEARCHERS AND PRACTITIONERS ENGAGED IN AUTOMATIC CONTROL ENGINEERING. PROF. MIN WU, SENIOR MEMBER OF THE IEEE, WORKS AT THE CENTRAL SOUTH UNIVERSITY, CHINA.

NONLINEAR SYSTEMS SHANKAR SASTRY 2013-04-18 THERE HAS BEEN MUCH EXCITEMENT OVER THE EMERGENCE OF NEW MATHEMATICAL TECHNIQUES FOR THE ANALYSIS AND CONTROL OF NONLINEAR SYSTEMS. IN ADDITION, GREAT TECHNOLOGICAL ADVANCES HAVE BOLSTERED THE IMPACT OF ANALYTIC ADVANCES AND PRODUCED MANY NEW PROBLEMS AND APPLICATIONS WHICH ARE NONLINEAR IN AN ESSENTIAL WAY. THIS BOOK LAYS OUT IN A CONCISE MATHEMATICAL FRAMEWORK THE TOOLS AND METHODS OF ANALYSIS WHICH UNDERLIE THIS DIVERSITY OF APPLICATIONS.

NONLINEAR CONTROL SYSTEMS ZORAN VUKIC 2003-02-04 THIS TEXT EMPHASIZES CLASSICAL METHODS AND PRESENTS ESSENTIAL ANALYTICAL TOOLS AND STRATEGIES FOR THE CONSTRUCTION AND DEVELOPMENT OF IMPROVED DESIGN METHODS IN NONLINEAR CONTROL. IT OFFERS ENGINEERING PROCEDURES FOR THE FREQUENCY DOMAIN, AS WELL AS SOLVED EXAMPLES FOR CLEAR UNDERSTANDING OF CONTROL APPLICATIONS IN THE INDUSTRIAL, ELECTRICAL, PROCE

APPLIED NONLINEAR CONTROL JEAN-JACQUES E. SLOLINE 1991 IN THIS WORK, THE AUTHORS PRESENT A GLOBAL PERSPECTIVE ON THE METHODS AVAILABLE FOR ANALYSIS AND DESIGN OF NON-LINEAR CONTROL SYSTEMS AND DETAIL SPECIFIC APPLICATIONS. THEY PROVIDE A TUTORIAL EXPOSITION OF THE MAJOR NON-LINEAR SYSTEMS ANALYSIS TECHNIQUES FOLLOWED BY A DISCUSSION OF AVAILABLE NON-LINEAR DESIGN METHODS.

ANALYSIS AND CONTROL OF NONLINEAR SYSTEMS JEAN LEVINE 2009-05-28 THIS BOOK EXAMINES CONTROL OF NONLINEAR SYSTEMS. COVERAGE RANGES FROM MATHEMATICAL SYSTEM THEORY TO PRACTICAL INDUSTRIAL CONTROL APPLICATIONS. THE AUTHOR OFFERS WEB-BASED VIDEOS ILLUSTRATING SOME DYNAMICAL ASPECTS AND CASE STUDIES IN SIMULATION.