Record Nr. UNINA9910484586103321 Developments in advanced control and intelligent automation for **Titolo** complex systems / / editors, Min Wu, Witold Pedrycz, Luefeng Chen Pubbl/distr/stampa Cham, Switzerland:,: Springer,, [2021] ©2021 **ISBN** 3-030-62147-2 Descrizione fisica 1 online resource (x, 411 pages): illustrations Collana Studies in systems, decision and control;; volume 329 629.8 Disciplina Soggetti Automatic control Robotics Control automàtic Robòtica Llibres electrònics Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Nota di bibliografia Includes bibliographical references and index. Intro -- Preface -- Contents -- Advanced Control Theory and Method Nota di contenuto -- Stability Analysis and Hinfty Control of Time-Delay Systems -- 1 Introduction -- 2 Stability Analysis Based on A Relaxed Integral Inequality -- 2.1 System Description -- 2.2 A Stability Criterion -- 2.3 A Numerical Example -- 3 Hinfty Control Design Based on A Parameter Tuning Method -- 3.1 Problem Formulation -- 3.2 Hinfty Performance Based Control Design -- 3.3 A Numerical Example -- 4 Load Frequency Control for A Delayed One-Area Power System -- 4.1 Dynamic Model of the LFC Scheme -- 4.2 Stability Assessment of PI-Based LFC Schemes -- 4.3 Design of the SF-Based LFC Scheme -- 4.4 Case Studies --References -- Active Disturbance Rejection in Repetitive Control Systems -- 1 Introduction -- 2 Repetitive Control -- 2.1 Two-Dimensional Property of Repetitive Control -- 2.2 Modified Repetitive-Control System -- 3 Equivalent-Input-Disturbance Approach -- 3.1 Basic Concept of Equivalent Input Disturbance -- 3.2 Equivalent-Input-Disturbance Estimation -- 3.3 Analysis of Disturbance Rejection -- 4

Disturbance Rejection for Repetitive Control System with Time-Varying Nonlinearity -- 4.1 Analysis and Design of Nonlinear MRCS -- 4.2

Design Algorithm for Nonlinear MRCS -- 4.3 Simulation Verification and Analysis -- 5 Conclusion -- References -- Intelligent Control of Underactuated Mechanical System -- 1 Introduction -- 2 Preparations -- 3 A Continuous Control Method for Planar Underactuated Manipulator with Passive First Joint -- 3.1 Continuous Controller Design -- 3.2 Optimization of Target Angles and Design Parameters --3.3 Simulations -- 4 A Unified Control Method for Planar Underactuated Manipulator with One Passive Joint -- 4.1 Trajectory Planning and Parameters Optimization -- 4.2 Trajectory Tracking Controllers Design -- 4.3 Simulations -- 5 Conclusion -- References. Finite-Time Fault Detection and Hinfty State Estimation for Markov Jump Systems Under Dynamic Event-Triggered Mechanism -- 1 Introduction -- 2 Finite-Time Fault Detection -- 2.1 Problem Formulation -- 2.2 Main Results -- 2.3 Detection Threshold Design --2.4 Numerical Example -- 3 Finite-Time Hinfty State Estimation -- 3.1 Problem Formulation -- 3.2 Main Results -- 3.3 Numerical Example --4 Conclusion -- References -- Intelligent Control and Decision-Making of Complex Metallurgical Processes -- Intelligent Control of Sintering Process -- 1 Sintering Process and Characteristics Analysis -- 1.1 Iron Ore Sintering Process -- 1.2 Characteristics Analysis for Sintering Process -- 1.3 Control Objectives -- 2 Carbon Efficiency Prediction and Optimization -- 2.1 Carbon Efficiency Hybrid Prediction Model -- 2.2 Carbon Efficiency Intelligent Optimization -- 2.3 Experimental Results and Analysis -- 3 Intelligent Control of Sintering Ignition Based on the Prediction of Ignition Temperature -- 3.1 Control Requirements and Control Structure -- 3.2 Prediction Model of Ignition Temperature --3.3 Design of Intelligent Controller -- 3.4 Experiment and Result Analysis -- 4 Fuzzy Control of Burn-Through Point Based on the Feature Extraction of Time Series Trend -- 4.1 Control Requirements and Control Structure -- 4.2 Feature Extraction of Time Series Trend --4.3 Design of Fuzzy Controller -- 4.4 Experimental Study and Result Analysis -- 5 Optimization and Control System of Carbon Efficiency --5.1 Architecture of OCSCE -- 5.2 Implementation Scheme -- 6 Conclusion -- References -- Decision-Making of Burden Distribution for Blast Furnace -- 1 Analysis of Ironmaking and Burden Distribution -- 1.1 Ironmaking Process -- 1.2 Gas Flow and Gas Utilization Rate --1.3 Effect of Burden Distribution -- 2 Prediction Model of Gas Utilization Rate.

2.1 Prediction Model of GUR Based on Chaos Theory -- 2.2 Prediction Model of GUR Based on Case-Matching -- 2.3 Prediction Model of GUR Based on Multi-time-Scale -- 3 Decision-Making Strategy -- 3.1 Structure of Decision-Making Strategy -- 3.2 Decision-Making Procedure -- 3.3 Decision-Making Verification -- 4 Conclusion --References -- Intelligent System and Machine Learning -- Granular Computing: Fundamentals and System Modeling -- 1 Introduction -- 2 Information Granules and Information Granularity -- 3 Frameworks of Information Granules -- 4 Information Granules and Their Two-Phase Development Process -- 4.1 Clustering as a Prerequisite of Information Granules -- 4.2 The Principle of Justifiable Granularity -- 5 Augmentation of the Design Process of Information Granules -- 6 Symbolic View at Information Granules and Their Symbolic Characterization and Summarization -- 7 Granular Probes of Spatiotemporal Data -- 8 Granular Models -- 8.1 The Concept -- 8.2 Construction of Granular Models -- 9 Conclusions -- References --Distributed Consensus Control for Nonlinear Multi-agent Systems -- 1 Introduction -- 1.1 Background and Related Work -- 1.2 Preliminaries -- 2 ADHDP-Based Distributed Consensus Control for MASs -- 2.1 Problem Formulation -- 2.2 ADHDP-Based Distributed Consensus

Control Method -- 2.3 Implementation of the ADHDP-Based Distributed Consensus Control Method -- 2.4 Simulation Results -- 3 ADP-Based Distributed Model Reference Consensus Control for MASs -- 3.1 Problem Formulation -- 3.2 ADP-Based Distributed Model Reference Control Method -- 3.3 MRAC Scheme for Individual Agent -- 3.4 Distributed Value Iteration Algorithm -- 3.5 Simulation Studies -- 4 Conclusion -- References -- Stochastic Consensus Control of Multiagent Systems under General Noises and Delays -- 1 Introduction -- 2 Problem Formulation and Preliminary.

3 Networks with Additive Noises -- 3.1 Mean Square Weak Consensus -- 3.2 Almost Sure Weak Consensus -- 3.3 Mean Square and Almost Sure Strong Consensus -- 4 Networks with Additive Noises and Delays -- 4.1 Mean Square Weak Consensus -- 4.2 Almost Sure Weak Consensus -- 4.3 Mean Square and Almost Sure Strong Consensus -- 5 Simulations -- 6 Conclusion -- References -- Multimodal Emotion Recognition and Intention Understanding in Human-Robot Interaction -- 1 Introduction -- 1.1 Multimodal Emotion Recognition -- 1.2 Emotional Intention Understanding -- 1.3 Emotional Human-Robot Interaction System -- 1.4 The Structure of the Chapter -- 2 Multimodal Emotion Feature Extraction -- 2.1 Regions of Interest based Feature Extraction in Facial Expression -- 2.2 Sparse Coding-SURF based Feature Extraction in Body Gesture -- 2.3 FCM based Feature Extraction in the Speech Emotion -- 3 Multimodal Emotion Recognition -- 3.1 Softmax Regression based Deep Sparse Autoencoder Network for Facial Emotion Recognition -- 3.2 Multi-SVM based Dempster-Shafer Theory for Gesture Recognition Using Sparse Coding Feature -- 3.3 Two-Layer Fuzzy Multiple Random Forest for Speech Emotion Recognition -- 3.4 Two-stage Fuzzy Fusion based Convolution Neural Network for Dynamic Facial Expression and Speech Emotion Recognition -- 4 Emotion Intention Understanding -- 4.1 Three-Layer Weighted Fuzzy Support Vector Regression for Emotion Intention Understanding -- 4.2 Dynamic Emotion Understanding in Human-Robot Interaction Based on Two-layer Fuzzy SVR-TS Model -- 5 Experiments and Applications of Emotional Human-Robot Interaction System -- 5.1 Multimodal Emotional Human-Robot Interaction System -- 5.2 The Application Experiment of Emotional Human-Robot Interaction System -- 6 Conclusion -- References.

Dynamic Multi-objective Optimization for Multi-objective Vehicle Routing Problem with Real-time Traffic Conditions -- 1 Introduction --2 Background -- 2.1 Basic Definitions -- 2.2 Dynamic Multi-objective Optimization Algorithms -- 3 Multi-objective Vehicle Routing Problem with Real-time Traffic Conditions -- 3.1 Road Network Topology -- 3.2 Formulation of MOVRPRTC -- 4 Offline Optimization and Online Optimization for MOVRPRTC -- 4.1 Framework of ALSDCMOEA -- 4.2 Online Optimization -- 5 Experiment -- 6 Conclusion -- References --Intelligent Robot System Design and Control -- Dielectric Elastomer Intelligent Devices for Soft Robots -- 1 Dynamic Modelling of Dielectric Elastomer Intelligent Actuator (DEIA) -- 1.1 Introduction -- 1.2 DEIA Manufacture and Experiment Platform Description -- 1.3 DEIA Modelling -- 1.4 Parameter Identification of Dynamic Model -- 1.5 Model Validation -- 2 Study of Soft Force and Displacement Intelligent Sensor (SFDIS) -- 2.1 Introduction -- 2.2 Experiment System Description -- 2.3 SFDIS Modelling -- 2.4 Parameter Identification of Sensing Model -- 2.5 Model Validation -- 3 Conclusion -- References -- Design of a 2-DOF Compliant Micropositioning Stage with Large Workspace -- 1 Introduction -- 2 Mechanical Design of XY Stage -- 2.1 Introduction of Basic Mechanisms -- 2.2 Propose of XY Stage -- 3 Static Modeling and Characteristic Analysis -- 3.1 Modeling of Single

Flexure Hinges -- 3.2 Transform of Compliance Matrix -- 3.3 Compliance Matrix of Each Part -- 3.4 Output Compliance Matrix of XY Stage -- 3.5 Input Compliance of XY Stage -- 3.6 Amplification Ratio of XY Stage -- 4 Model Verification with FEA -- 5 Conclusion -- References -- Assistive Robots -- 1 Introduction -- 2 Human-Body-Motion-Controlled Electric Wheelchair -- 2.1 Electric Wheelchair with Human-Body-Motion Interface -- 2.2 Tuning of Gain A -- 2.3 Experiments. 2.4 Conclusion.