

# **2021 7th International Conference on Control, Instrumentation and Automation (ICCIA 2021)**

**Tabriz, Iran  
23-24 February 2021**



**IEEE Catalog Number: CFP2179S-POD  
ISBN: 978-1-6654-3001-2**

**Copyright © 2021 by the Institute of Electrical and Electronics Engineers, Inc.  
All Rights Reserved**

*Copyright and Reprint Permissions:* Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

***\*\*\* This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP2179S-POD
ISBN (Print-On-Demand):	978-1-6654-3001-2
ISBN (Online):	978-1-6654-0350-4

**Additional Copies of This Publication Are Available From:**

Curran Associates, Inc  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: (845) 758-0400  
Fax: (845) 758-2633  
E-mail: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

CURRAN ASSOCIATES INC.  
**proceedings**  
.com

## Table of Contents

Optimal Control of SEIR Epidemic Model Considering Nonlinear Transmission Rate and Time Delay...	1
Modeling and Controller Design of Nonlinear Dynamical Systems Using Extended-Time Delay-Petri Nets Tool.....	6
Constrained multivariable dynamic matrix control for a class of fractional order system.....	12
Design of a robust observer-based DP control system for an ROV with unknown dynamics including thruster allocation.....	18
Designing Fuzzy Fault Tolerant Controller for a DC Micro grid Based on Virtual Sensor.....	24
Adaptive Backstepping Output Feedback Control of Switched Uncertain Linear Systems.....	30
Estimating the state of a One-sided quantum Cavity Driven by Vacuum field in Schrodinger Picture.....	36
Rough Neural Network and Adaptive Feedback Linearization Control Based on Lyapunov Function.....	41
Nonlinear Sub-Optimal Controller for Ebola Virus Disease: State-Dependent Riccati Equation Approach.....	46
Multivariable Nonlinear Model Predictive Controller Design for Air-Handling Unit with Single Zone in Variable Air Volume.....	52
Adaptive Fractional order Control of Photovoltaic Power Generation System with Disturbance Observer.....	58
The dynamic of a quantum optomechanical cavity cascaded with a two-level atom.....	63
Sliding Mode Air-to-Fuel Ratio Control of Spark Ignition Engines in Comprehensive Powertrain System.....	67
Consensus of First Order Multi-agent Systems with Actuator or dynamic Fault by weighted adjacency matrix approach (WAMA).....	72
Robust Control of a Permanent Magnet Synchronous Generators based Wind Energy Conversion.....	78
Application of PID and Norm Optimal Iterative Learning Control to Swash Mass Helicopter.....	83
Fusion Estimation of Local Bus Frequency for Robust Wide Area Power System Stabilizer.....	89
Data-driven Model Predictive Controller Design for Left Ventricular Assist Devices.....	94
Robust Control of Induction Motor in Presence of Disturbance.....	99
Quaternion-based Hybrid Feedback for Global Asymptotic Attitude Stabilization on S3.....	104
Observer-based controller design for a class of networked control systems with transmission delays and packet losses.....	109
LPV Control Of An Influenza Model With Vaccination And Antiviral Treatment.....	115

2021 7th International Conference on Control, Instrumentation and Automation (ICCIA)

Cost-Emission Control Based Physical-Resilience Oriented Strategy for Optimal Allocation of Distributed Generation in Smart Microgrid.....	120
Application of Deep Learning Neural Networks for Nitrate Prediction in the Klokot River, Bosnia and Herzegovina.....	126
Offline Neural Network Based-Fault Tolerant Control for Vertical Tail Damaged Aircraft.....	132
Support Vector Machine for False Alarm Detection in Wind Turbine Management.....	137
Discrete-time inverse optimal control for consensus of multi-agent systems via a novel meta-heuristic algorithm.....	142
Designing full-order sliding mode controller based on neural network for a class of chaotic systems....	147
A New Approach Based on Fuzzy-Adaptive Structure & Parameter Learning Applied in Meta-Cognitive Algorithm for ANFIS.....	152
Output tracking of a 6-DOF flying wing UAV in longitudinal motion using LQR optimized sliding mode control with integral action.....	157
A Fault-Tolerant Control Strategy using Virtual Actuator Approach for Flexible Robot Links with Hysteresis.....	162
Adaptive predictive controller design for nonlinear grid-connected PMSG based wind energy conversion system using dynamic matrices.....	167
Fault Detection of Induction Motors Using Just In Time Classifiers.....	172
Fixed-Time MPPT Controller Design For Wind Turbine System with Prescribed Performance.....	177
Secure Centralized Kalman Filter for Network Environments by Homomorphic Encryption.....	183
Economic Model Predictive Controller Design with a New Cost Function for Linear Systems.....	189
Continuous nonsingular terminal sliding mode control for mismatched uncertain nonlinear systems using algebraic parameter identification.....	195
International Stock Index Prediction Using Artificial Neural Network (ANN) and Python Programming.....	200
Stabilizing of a Class of Nonlinear Fractional Order Systems with Input Saturation Constraint.....	207
Design of Robust State Estimation Filter in The Present of Uncertainty, Fault and Unknown Input.....	212
Robust Laguerre based model predictive control of nonholonomic mobile robots under slip conditions.....	217
On the Design of a Nonlinear Model Predictive Controller based on Enhanced Disturbance Observer for Dynamic Walking of Biped Robots.....	222
Transportation of an Unknown Cable-Suspended Payload by a Quadrotor in Windy Environment Under Aerodynamics Effects.....	228
SCADA data analytics for fault detection and diagnosis of wind turbines.....	234

2021 7th International Conference on Control, Instrumentation and Automation (ICCIA)

Leader-following consensus of nonlinear multi-agent systems based on position and velocity estimations.....	240
Wind Turbines Acoustic Inspections performed with UAV and sound frequency domain analysis.....	247
Robust Temporal Logic Motion Planning Based on Invariant Set Theory.....	252
On the global stabilization of a Class of Nonlinear Singularly Perturbed Systems using Nonlinear H-infinity Control Approach.....	258
Improved Electric Differential System for Independent Speed Control of Brushless DC Motors Driven Electric Vehicles.....	263
Design of a Continuous Fractional-Order Nonsingular Terminal Sliding Mode Control with Time Delay Estimation for FES Control of Human Knee Joint.....	268
Person Identification with Masked Face and Thumb Images under Pandemic of COVID-19.....	273
Pressure control of cellular electromechanical medical mattress for bedsore prevention.....	277
Design of Robust $H_{\infty}$ Controller based on Nonlinear observer for Sensorless PMSM using LMIs.....	284
A New Fast Finite Time Fractional Order Adaptive Sliding-Mode Control of a Quadrotor UAV.....	290
Optimization of Pyramidal Reaction Wheel Configuration for Minimizing Angular Momentum.....	295
Backstepping Fractional Terminal Sliding Mode Control Design for a TRMS.....	301
The Validity of Deep Learning Computational Model for Wind Speed Simulation.....	306
Unbalanced Voltage Compensation in the Primary and Secondary Control Levels of AC Microgrids...311	
A Simple Matlab Simulink Model for Adaptive General Type-2 Fuzzy Logic Systems.....	317
Adaptive Sliding Mode Control of a Three-DOF MEMS Vibratory Tri-axial Gyroscope with the Capability of Angular Velocity Estimation.....	321
Designing Multirate Controller for Optimal Tracking of Nonholonomic Laparoscopic Robotic Arm in a Telesurgery System.....	328
Tracking of Two Connected Inverted Pendulum on Carts by Using A Fast Terminal Sliding Mode Control with Fixed-time Convergence.....	334
Fuzzy Finite-time Consensus Control for Nonlinear Second-order Multi-agent Systems with Disturbances by Integral Sliding Mode.....	339
A novel algorithm on adaptive backstepping control for a class of uncertain fractional-order systems: an ADRC approach.....	344
A Novel Electronic Nose Instrument for the Detection of Volatile Hazardous Compounds: Preliminary Results.....	349
Design of Linear Parameter Varying Controller for Hydrostatic Transmission System (HST).....	354
Newton-based extremum seeking for a static map coupled with a diffusion PDE at an arbitrary interior point.....	359

L1 Adaptive Control Design for SRS Robot Using Gaussian Process Regression.....	364
Integration of Mathematical Modeling with HAZOP Study of a Polymerization Plant: Capabilities and Lacunae.....	370
Data-driven Iterative Learning Formation Control of Non-affine Multi-agent Systems Using Integral Sliding Mode Method.....	376
Review on Machine Learning Frameworks in Drivers' Physiological Signal Analysis to Detect Stress.....	382
Performance and Vulnerability of Distributed Secondary Control of AC Microgrids under Cyber-Attack.....	388
Hybrid Model Predictive Control strategy of renewable resources in DC microgrids based on Mixed Logic Dynamics and Measurements.....	394
Hierarchical Robust Model-based Predictive Control in Supply Chain Management under Demand Uncertainty and Time-delay.....	399
A Nonlinear MPC Approach for Blood Glucose Regulation in Diabetic Patients.....	405
Distributed $H_\infty$ filtering for interconnected large-scale systems with time-varying delays.....	409
Finite-Time Fuzzy Control Design for Drug Dosage Delivery in Cancer Treatment.....	414
Decentralized Output Feedback $H_\infty$ Control for a Quadruple Tank System.....	420
Tracking problem in robotic teleoperation systems without force and velocity measurements in the presence of time delay.....	425
Variable structure control of quadrotor based on position input.....	431
A Resilient Control Method Against False Data Injection Attack in DC Microgrids.....	437