

# **2016 4th International Conference on Robotics and Mechatronics (ICROM 2016)**

**Tehran, Iran  
26-28 October 2016**



**IEEE Catalog Number: CFP16RSI-POD  
ISBN: 978-1-5090-3223-5**

**Copyright © 2016 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:	CFP16RSI-POD
ISBN (Print-On-Demand):	978-1-5090-3223-5
ISBN (Online):	978-1-5090-3222-8

**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

Control of flexible joint underactuated manipulator in task space .....	1
Achieving Extreme Precisions for Multiple Manipulators Using a Proper Coupled Neural Network Matrix Method and LabVIEW Instrumentation.....	7
Mechanical Analysis of Ultrasonic Flow Meter based on Doppler Effect.....	14
NURBS-based Representation of Urban Environments for Mobile Robots.....	20
WeeMiK: A low-cost omnidirectional swarm platform for outreach, research and education .....	26
Design and Modeling of A Novel Multi-Functional Elastic Actuator (MFEA).....	32
An Adaptable Cat-Inspired Leg Design With Frequency-Amplitude Coupling .....	37
Robust Fractional Order PDD Control of Spacecraft Rendezvous.....	42
An Observer-Based Adaptive Impedance-Control for Robotic Arms: Case Study in SMOS Robot49 .....	49
Modifying the Attitude of Quadruped Robot Body against Disturbances via Data Fusion .....	55
Visual Servoing Control of Robot Manipulator in 3D Space Using Fuzzy Hybrid Controller .....	61
Nonlinear Adaptive Impedance Control of a Virtual Tool-Tissue Interaction for Use in Endoscopic Sinus Surgery Simulation System.....	66
Estimation of External Forces Acting on the Legs of a Quadruped Robot using Two Nonlinear Disturbance Observers .....	72
Extended Fuzzy Logic Controller for Uncertain Teleoperation System .....	78
Phenomenological Contact Model Characterization and Haptic Simulation of an Endoscopic Sinus and Skull Base Surgery Virtual System.....	84
Development a Fuzzy PID Controller for a Parallel Cable Robot with Flexible Cables .....	90
Design and Control of a Steerable Screw In-pipe Inspection Robot .....	98
AUTMan: Design, Development and Control of Multi-DoF Manipulators for use in Robotics and Automation Demands .....	105
Foot-Controlled Endoscope Positioner for Laparoscopy: Development of the Master and Slave Interfaces .....	111
Estimation of Decentralized Unknown Dynamics for a 2DOF Manipulator Using a Time Varying Extended State Observer.....	116
3D Inertial Algorithm of SLAM for Using on UAV .....	122
Stepping Stabilization Using a Combination of DCM Tracking and Step Adjustment .....	130
Robust H <sub>infinity</sub> Control of a 2RT Parallel Robot For Eye Surgery .....	136
Posture Regulation of Input Constrained Differential Drive Robots with Bounds on Stabilization Time .....	142

<b>Model-Based Online Estimation Of Interaction Force in Beating Heart Robotic-Assisted Surgery .....</b>	<b>148</b>
<b>Kinematics and Dynamics Analysis of a 2-DOF Spherical Parallel Robot .....</b>	<b>154</b>
<b>Experimental Kinematic Identification of a 3-DOF Decoupled Parallel Robot Using Calibrated Kinect Sensor .....</b>	<b>160</b>
<b>An Experimental Study on Friction Identification of a Pneumatic Actuator and Dynamic Modeling of a Proportional Valve .....</b>	<b>166</b>
<b>Intelligent Path Following of Articulated Eight-Wheeled Mobile Robot with Nonholonomic Constraints .....</b>	<b>173</b>
<b>Integral Sliding Mode Control of Bilateral Teleoperation with Force Estimation for n-DOF Nonlinear Manipulators .....</b>	<b>179</b>
<b>Experimental Identification of Friction and Dynamics of an Overconstrained 3-DOF Decoupled Parallel Mechanism .....</b>	<b>185</b>
<b>A SystemC Model of Energy Harvesting CMOS Digital Pixel Sensor .....</b>	<b>192</b>
<b>Feed-Forward Learning with Frequency Adaptation towards the Control of Series Elastic Actuators.</b>	<b>196</b>
<b>Modeling and design of appropriate compensation for DTG (Dynamically Tuned Gyroscope) and improving sensor response using a Kalman filter.....</b>	<b>202</b>
<b>Mechatronic Design and Construction of a Five Axes Satellite Simulator.....</b>	<b>210</b>
<b>Robust Fuzzy Model Identification for nonlinear dynamical systems .....</b>	<b>216</b>
<b>Singularity Configurations Analysis of a 4-DOF Parallel Mechanisms Using Grassmann-Cayley Algebra .....</b>	<b>222</b>
<b>Bio-signal interface for knee rehabilitation robot utilizing EMG signals of thigh muscles .....</b>	<b>228</b>
<b>Energy-efficient Position Control of an Actuator in a Digital Hydraulic System Using On/Off Valve ...</b>	<b>234</b>
<b>Autonomous Flight and Obstacle Avoidance of a Quadrotor By Monocular SLAM .....</b>	<b>240</b>
<b>Position Control of a Servo-Pneumatic Actuator using Generalized Maxwell-Slip Friction Model .....</b>	<b>246</b>
<b>Multi-class Fault Detection In Electro-hydraulic Servo Systems Using Support Vector Machines.....</b>	<b>252</b>
<b>Concurrent Learning based Finite Time Parameter Estimation in Adaptive Control of Uncertain Switched Systems .....</b>	<b>258</b>
<b>System and method for recognizing human emotion state based on analysis of speech and facial feature extraction; Applications to Human-Robot Interaction .....</b>	<b>266</b>
<b>Imroving localization in NLOS Condition using RF Beacons .....</b>	<b>272</b>
<b>Fast Adaptive Fault estimation for linear system with actuator effectiveness loss and unmatched unknown inputs .....</b>	<b>278</b>
<b>Vibrations Stabilization of a Euler-Bernoulli Beam in Contact With a Fluid Using Piezoelectric Actuators .....</b>	<b>285</b>
<b>Effects of Piezoelectric Actuators on a Shell Vibrations Containing Fluid .....</b>	<b>289</b>
<b>Suppressing the Vibrations of Timoshenko Beam Using Boundary Dampers .....</b>	<b>296</b>

<b>Adaptive Control for Force-Reflecting Dual User Teleoperation Systems.....</b>	<b>302</b>
<b>Visual Servoing Simulator by Using ROS and Gazebo .....</b>	<b>308</b>
<b>Assistive Control of a Compliantly Actuated Single Axis Stage .....</b>	<b>313</b>
<b>Design, kinematics and dynamics modeling of lower-limb walking assistant robot.....</b>	<b>319</b>
<b>An Estimation for Heart Motion in Robot-Assisted Beating Heart Surgery Using a Modified Adaptive EKF.....</b>	<b>325</b>
<b>theta-D Based Nonlinear Tracking control of Quadcopter.....</b>	<b>331</b>
<b>Robust H<math>\infty</math> Control for Path Tracking of a Quadrotor through Estimation of System Parameters.....</b>	<b>337</b>
<b>Fuzzy Logic Trajectory Tracking Control of a 3-RS Ball and Plate Parallel Manipulator .....</b>	<b>343</b>
<b>A Rehabilitation Robot for Continuous Passive Motion of Foot Inversion-Eversion.....</b>	<b>349</b>
<b>Alarm Management based Fault Diagnosis of V94.2 Gas Turbines by Applying Linear Filters .....</b>	<b>355</b>
<b>Asymmetric Gait Analysis based on Passive Dynamic Walking Theory .....</b>	<b>361</b>
<b>Time-Delay Estimation Of Nonlinear Systems With Delay In States And Outputs .....</b>	<b>367</b>
<b>Prescribed Performance Control of Quadruped Robot.....</b>	<b>374</b>
<b>An active model for gastrocnemius muscle activity topredict the impact force during running .....</b>	<b>380</b>
<b>Experimental Study on Optimal Motion Planning of Wheeled Mobile Robot Using Convex Optimization and Receding Horizon Concept .....</b>	<b>386</b>
<b>Design of a Robust Controller for a Tethered Segway on Dome-Shaped Structures .....</b>	<b>392</b>
<b>Achiving Transparency in Series Elastic Actuator of Sharif Lower Limb Exoskeleton using LLNF-NARX Model.....</b>	<b>398</b>
<b>A Novel Three-Mass Inverted Pendulum Model for Real-Time Trajectory Generation of Biped Robots .....</b>	<b>404</b>
<b>Direct Kinematics of a Three Revolute-Prismatic-Spherical Parallel Robot Using a fast Homotopy Continuation Method.....</b>	<b>410</b>
<b>Online Path Planning for SURENA III Humanoid Robot Using Model Predictive Control Scheme .....</b>	<b>416</b>
<b>RoboParrot 2.0: A Multi-Purpose Social Robot .....</b>	<b>422</b>
<b>Design of a Novel Three Degrees of Freedom Ankle Prosthesis Inspired by Human Anatomy .....</b>	<b>428</b>
<b>Push Recovery of a Humanoid Robot Based On the Model Predictive Control and Capture Point .....</b>	<b>433</b>
<b>Design Improvement of a 2-DOF Ankle Joint Actuation Mechanism for a Humanoid Robot .....</b>	<b>439</b>
<b>Hysteresis Modeling of SMA in the Tail of a Bio-inspired Vehicle by ANFIS.....</b>	<b>445</b>
<b>Trackerbot: A Robotic Surveillance System based on Stereo-Vision and Artificial Neural Networks ..</b>	<b>449</b>
<b>Design and Fabrication of a Gripper Actuated by Shape Memory Alloy Spring .....</b>	<b>455</b>
<b>An Energy-Saving Robust Motion Control of Redundant Electro-hydraulic Servo Systems .....</b>	<b>459</b>
<b>Simplifying user interaction solutions for the FUM Bionic Hand-I .....</b>	<b>465</b>

<b>EMG-Based Estimation of Shoulder Kinematic Using Neural Network and Quadratic Discriminant Analysis .....</b>	<b>471</b>
<b>Sensory Feedback Performance Improvement on RoboCab: An Experimental Approach to Wire–Driven Parallel Manipulator .....</b>	<b>477</b>
<b>System Identification of a Linear Series Elastic Actuator using a Recursive Taguchi-based Algorithm</b>	<b>483</b>
<b>Jacobian-Based Singularity Analysis of a 3-CRRR Spatial Parallel Robot.....</b>	<b>489</b>
<b>Type Synthesis of 2R-T Parallel Mechanisms Based on the Screw Theory for Haptic Applications .....</b>	<b>495</b>
<b>Simulation and Investigation of a Particle Positioning Device Performance by Acoustophoretic Phenomenon .....</b>	<b>501</b>
<b>An Experimental System Identification Modeling and Robust Control for NAO Humanoid Robot.....</b>	<b>506</b>
<b>Particle Filters for Non-Gaussian Hunt-Crossley Model of Environment in Bilateral Teleoperation....</b>	<b>512</b>
<b>Dynamic Identification of the Novint Falcon Haptic Device.....</b>	<b>518</b>
<b>The Real-Time Facial Imitation by a Social Humanoid Robot.....</b>	<b>524</b>
<b>Conceptual Design of a Lower Limb Exoskeleton Actuated by Shape Memory Alloys for Assisting Elderly People in Stair Climbing .....</b>	<b>530</b>
<b>Weighted Kinematic Sensitivity of a 4-DOF Robot .....</b>	<b>536</b>
<b>Computational Dynamic Modeling and Sequential PID Controlling of a Tendon-Based Manipulator with Highly Slender Flexible Arms.....</b>	<b>542</b>
<b>Conceptual Design and Modeling of an Adaptable Robotic Mechanism Actuated by Shape Memory Alloys for Inspection of Low Diameter Pipes .....</b>	<b>548</b>
<b>Joint torques in biped gait following changes in leg length .....</b>	<b>554</b>
<b>Visual Servoing in a Cable Robot Using Microsoft Kinect v2 Sensor .....</b>	<b>560</b>
<b>Conceptual Design of a Social Robot for Pediatric Hospitals .....</b>	<b>566</b>
<b>A Simple and Fast Geometric Kinematic Solution for Imitation of Human Hands by a NAO Humanoid Robot .....</b>	<b>572</b>
<b>Real-Time Point-Cloud-Based Haptic Rendering with Fast Contact Detection .....</b>	<b>578</b>
<b>An Adaptive Algorithm for Fast Moving Object Detection from Dynamic Background based on Cobebook .....</b>	<b>584</b>
<b>Safe Collaboration of Humans and SCARA Robots .....</b>	<b>589</b>
<b>Dynamic Identification and Model based Control of an Omni-wheeled Mobile Robot .....</b>	<b>595</b>
<b>RF source Localization using Reflection Model in NLOS Condition.....</b>	<b>601</b>
<b>Introducing i-puck: An Educational Mobile Robot .....</b>	<b>607</b>
<b>Real-time Video Stabilization and Mosaicking for Monitoring and Surveillance .....</b>	<b>613</b>
<b>Evolutionary Particle Filter Applied to Leader-Labor Multi-robot Localization for Communication Failure and Kidnapped Situations .....</b>	<b>619</b>