Part I  Design and Manufacturing of the Robot

Critical Review and Progress of Adaptive Controller Design for Robot Arms ................................................................. 3
Dan Zhang and Bin Wei

Stiffness Analysis of a Planar 3-RPS Parallel Manipulator ............. 13
Bo Hu, Chunxiao Song and Bo Li

Overview of an Engineering Teaching Module on Robotics Safety.... 29
Dan Zhang, Bin Wei and Marc Rosen

Mobile Robot Applied to QR Landmark Localization Based on the Keystone Effect ......................................................... 45
Vibekananda Dutta

Mehmet Serdar Güzel and Hakan Kayakökü

Kinematic Performance Analysis of a Hybrid-Driven Waist Rehabilitation Robot .......................................................... 73
Bin Zi, Guangcai Yin, Yuan Li and Dan Zhang

Admittance Filter Parameter Adjustment of a Robot-Assisted Rehabilitation System (RehabRoby) .............................................. 87
Fatih Ozkul, Duygun Erol Barkana and Engin Maşazade

Continuum Robot Surfaces: Smart Saddles and Seats. ............... 97
Ian D. Walker

Structural Parameter Identification of a Small Robotic Underwater Vehicle ................................................................. 107
Martin Langmajer and Lukáš Bláha
Using Online Modelled Spatial Constraints for Pose Estimation in an Industrial Setting ........................................ 123

Comparison Study of Industrial Robots for High-Speed Machining . . . 135
Alexandr Klimchik, Alexandre Ambiehl, Sebastien Garnier, Benoit Furet and Anatol Pashkevich

Adaptive Robust Control and Fuzzy-Based Optimization for Flexible Serial Robot ......................................................... 151
Fangfang Dong, Jiang Han and Lian Xia

Wired Autonomous Vacuum Cleaner ........................................ 167
Emin Faruk Kececi and Fatih Kendir

Human Safety Index Based on Impact Severity and Human Behavior Estimation ......................................................... 177
Gustavo Alfonso Garcia Ricardez, Akihiko Yamaguchi, Jun Takamatsu and Tsukasa Ogasawara

Swarm Robots’ Communication and Cooperation in Motion Planning .......................................................... 191
Khiem N. Doan, An T. Le, Than D. Le and Nauth Peter

Indoor Localization for Swarm Robotics with Communication Metrics Without Initial Position Information ......................... 207
Türker Türkoral, Özgür Tamer, Suat Yetiş and Levent Çetin

Multi-objective Optimization of a Parallel Fine-tuning Manipulator for Segment Assembly Robots in Shield Tunneling Machines ........ 217
Guohua Cui, Haidong Zhou, Yanwei Zhang and Haibin Zhou

An Imitation Framework for Social Robots Based on Visual Input, Motion Sensation, and Instruction ................................. 241
Mohsen Falahi, Faraz Shamshirdar, Mohammad Hosein Heydari and Taher Abbas Shangari

Part II Mechanical Engineering and Power System

New Reactionless Spatial Grasper Design and Analysis ..................... 257
Dan Zhang and Bin Wei

Tracking and Vibration Control of a Carbon Nanotube Reinforced Composite Robotic Arm ........................................ 265
Mohammad Azadi and Behzad Hasanshahi
Synthesis and Analysis of Pneumatic Muscle Driven Parallel Platforms Imitating Human Shoulder .......................... 275
Xingwei Zhao, Bin Zi and Haitao Liu

Conceptual Design of Energy Efficient Lower Extremity Exoskeleton for Human Motion Enhancement and Medical Assistance ........... 289
Nazim Mir-Nasiri

A New Algorithm for Analyzing Method of Electrical Faults of Three-Phase Induction Motors Using Duty Ratios of Half-Period Frequencies According to Phase Angle Changes .......... 303
YoungJin Go, Myoung-Hyun Song, Jun-Young Kim, Wangrim Choi, Buhm Lee and Kyoung-Min Kim

Mathematical Foundations and Software Simulation of Stress-Strain State of the Plate Container Ship ..................... 319
Anatoliy Nyrkov, Sergei Sokolov, Valery Maltsev and Sergei Chernyi

Kalman Filtering for Precise Mass Flow Estimation on a Conveyor Belt Weigh System ............................................ 329
Tauseef Rehman, Waleed Tahir and Wansoo Lim

Part III Automation and Control Engineering

Stiffness Analysis and Optimization for a Bio-inspired 3-DOF Hybrid Manipulator .................................................. 341
Dan Zhang and Bin Wei

Robust Gust Rejection on a Micro-air Vehicle Using Bio-inspired Sensing ................................................................. 351
William A. Dean, Badri N. Ranganathan, Ivan Penskiy, Sarah Bergbreiter and J. Sean Humbert

Development of Guidance, Navigation and Control System Using FPGA Technology for an UAV Tricopter ..................... 363
Arturo Cadena, Ronald Ponguillo and Daniel Ochoa

Fault Recoverability Analysis via Cross-Gramian ......................... 377
Hamid Reza Shaker

Implementation of RFID-Based Car Ignition System (CIS) in Kazakhstan ............................................................. 387
Nurbek Saparkhojayev, Askar Kurymbayev and Azret Akhmetov

Design and Development of a Self-adaptive, Reconfigurable and Low-Cost Robotic Arm ............................................. 395
Kemal Oltun Evliyaoğlu and Meltem Elitaş
Workplace Emotion Monitoring—An Emotion-Oriented System
Hidden Behind a Receptionist Robot ........................................ 407
Paulo Gurgel Pinheiro, Josue J.G. Ramos, Vander L. Donizete,
Pedro Picanço and Gustavo H. De Oliveira

Optimum Control for the Vehicle Semi-active Suspension System .... 421
Ayush Garg, Akshay Arvind and Bhargav Gadhvi

Depth Control of AUV Using a Buoyancy Control Device .......... 431
Mahdi Choyekh, Naomi Kato, Yasuaki Yamaguchi, Ryan Dewantara,
Hidetaka Senga, Hajime Chiba, Muneo Yoshie, Toshinari Tanaka
and Eiichi Kobayashi

DOB Tracking Control for Systems with Input Saturation and
Exogenous Disturbances via T-S Disturbance Modelling .......... 445
Xiangxiang Fan, Yang Yi and Yangfei Ye

Application of H-Infinity Output-Feedback Control with Analysis of
Weight Functions and LMI to Nonlinear Nuclear Reactor Cores .... 457
Gang Li, Bin Lian, Xueqian Wang, Xiu Li and Bo Xia
Mechatronics and Robotics Engineering for Advanced and Intelligent Manufacturing
Zhang, D.; Wei, B. (Eds.)
2017, X, 468 p. 240 illus., 173 illus. in color., Hardcover
ISBN: 978-3-319-33580-3