

2022 IEEE 17th International Conference on Advanced Motion Control (AMC 2022)

**Padova, Italy
18-20 February 2022**



**IEEE Catalog Number: CFP22403-POD
ISBN: 978-1-7281-7712-0**

**Copyright © 2022 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:	CFP22403-POD
ISBN (Print-On-Demand):	978-1-7281-7712-0
ISBN (Online):	978-1-7281-7711-3
ISSN:	1943-6572

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
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

<p>ZONOTOPIC KALMAN OBSERVER-BASED SENSOR FAULT ESTIMATION FOR DISCRETE-TIME TAKAGI-SUGENO FUZZY SYSTEMS.....</p> <p style="padding-left: 2em;"><i>Weijie Ren, Satoshi Komada, Kazuhiro Yubai, Daisuke Yashiro</i></p>	1
<p>DESIGN AND CHARACTERIZATION OF A FULLY INTEGRATED CONTINUUM ROBOT ACTUATED BY SHAPE MEMORY ALLOY WIRES.....</p> <p style="padding-left: 2em;"><i>Michele A. Mandolino, Yannik Goergen, Paul Motzki, Gianluca Rizzello</i></p>	6
<p>PERFORMANCE EVALUATION OF A GAIN-SCHEDULED PROPELLER THRUST CONTROLLER USING WIND VELOCITY AND ROTOR ANGULAR VELOCITY UNDER FLUCTUATING WIND</p> <p style="padding-left: 2em;"><i>Yuki Kato, Daisuke Yashiro, Kazuhiro Yubai, Satoshi Komada</i></p>	12
<p>AN APPROACH OF LOAD-SIDE DISTURBANCE REJECTION CONTROL FOR SERIES ELASTIC ACTUATORS.....</p> <p style="padding-left: 2em;"><i>Atsushi Hiraoka, Toshiyuki Murakami</i></p>	18
<p>PRELIMINARY ANALYSIS FOR TWO-DEGREE-OF-FREEDOM MAGNETIC GEARED SCREW MOTOR WITH HIGH TORQUE DENSITY</p> <p style="padding-left: 2em;"><i>Yoshiyuki Hatta, Kazuaki Ito, Yasutaka Fujimoto</i></p>	24
<p>EXPERIMENTAL VERIFICATION OF A NOVEL CONTINUOUSLY VARIABLE TRANSMISSION WITH ELECTRO-HYDROSTATIC ACTUATOR</p> <p style="padding-left: 2em;"><i>Hiroshi Asai, Kei Sugihara, Tomoya Kitamura, Yuki Saito, Kouhei Ohnishi, Takahiro Nozaki</i></p>	30
<p>INPUT SHAPING FOR NON-ZERO INITIAL CONDITIONS AND ARBITRARY INPUT SIGNALS WITH AN APPLICATION TO OVERHEAD CRANE CONTROL.....</p> <p style="padding-left: 2em;"><i>Arne Wahrburg, Janne Jurvanen, Matias Niemela, Mikael Holmberg</i></p>	36
<p>OBJECT DETECTION IN MOTION REPRODUCTION SYSTEM WITH SEGMENTATION ALGORITHM.....</p> <p style="padding-left: 2em;"><i>Xiaobai Sun, Takahiro Nozaki, Kouhei Ohnishi, Toshiyuki Murakami</i></p>	42
<p>PROBABILISTIC CAMERA-TO-KINEMATIC MODEL CALIBRATION FOR LONG-REACH ROBOTIC MANIPULATORS IN UNKNOWN ENVIRONMENTS.....</p> <p style="padding-left: 2em;"><i>Petri Makinen, Pauli Mustalahti, Sirpa Launis, Jouni Mattila</i></p>	48
<p>PATH OPTIMIZATION FOR AUTONOMOUS SEDIMENT SCOOPING OPERATION IN TUNNELS.....</p> <p style="padding-left: 2em;"><i>Naotoshi Higuchi, Yutaka Uchimura</i></p>	56
<p>MOTION GENERATION BASED ON PHYSICAL PROPERTY ESTIMATION IN MOTION COPY SYSTEM.....</p> <p style="padding-left: 2em;"><i>Tomoya Kitamura, Xiaobai Sun, Yuki Saito, Hiroshi Asai, Takahiro Nozaki, Kouhei Ohnishi</i></p>	62
<p>ECOS-ILC: AN ITERATIVE LEARNING CONTROL APPROACH WITH SET-MEMBERSHIP UNCERTAINTY.....</p> <p style="padding-left: 2em;"><i>Daniele Ronzani, Joris Gillis, Goele Pipeleers, Jan Swevers</i></p>	68
<p>OPTIMIZED EXPONENTIAL SQUARE ROOT UNSCENTED KALMAN FILTER FOR STATE ESTIMATION OF HYDRAULIC SYSTEMS</p> <p style="padding-left: 2em;"><i>Reza Mohammadi Asl, Jouni Mattila</i></p>	76

TRACK-FOLLOWING CONTROL USING RESONANT FILTER FOR DUAL-STAGE-ACTUATOR SYSTEM IN HARD DISK DRIVES.....	82
<i>Takenori Atsumi, Shota Yabui</i>	
DESIGN STRATEGY OF HEAD POSITIONING CONTROL SYSTEM OF HDD BASED ON AMPLITUDE SPECTRUM.....	88
<i>Shota Yabui, Takenori Atsumi</i>	
GAUSSIAN PROCESS AND DISTURBANCE OBSERVER BASED CONTROL FOR DISTURBANCE REJECTION.....	94
<i>Hanul Jung, Sehoon Oh</i>	
FREQUENCY RESPONSE DATA-BASED MULTIPLE PEAK FILTER DESIGN APPLIED TO HIGH-PRECISION STAGE IN TRANSLATION AND PITCHING	100
<i>Masahiro Mae, Wataru Ohnishi, Hiroshi Fujimoto, Koichi Sakata</i>	
A STUDY ON REDUCING EFFECT OF TEMPORAL QUANTIZATION ERROR IN PULSE DRIVE SYSTEMS.....	106
<i>Masayasu Suzuki, Mitsuo Hirata</i>	
EVALUATION OF TEMPERATURE DEPENDENCY FOR DISPLACEMENT ESTIMATION IN PIEZOELECTRIC STACK ACTUATORS.....	112
<i>Chihiro Mikuriya, Kenta Seki, Makoto Iwasaki</i>	
HIGH PRECISION MACHINING FORCE CONTROL OF VCM-DRIVEN DEBURRING EQUIPMENT.....	118
<i>Kazuaki Ito, Yoshiyuki Hatta, Takayoshi Yamada, Junya Sato, Yoshitaka Shiroyama, Tatsuya Hamajima</i>	
IMPERFECT DYNAMIC MODELING OF PARALLEL ROBOTS EASES THE CROSSING OF TYPE-II SINGULARITIES	124
<i>Adrian Peidro, Andres Quijada-Fernandez, David Ubeda, Rafael Puerto, Luis Paya, Oscar Reinoso</i>	
A SMOOTH REFORMULATION OF COLLISION AVOIDANCE CONSTRAINTS IN TRAJECTORY PLANNING	132
<i>Dries Dirckx, Joris Gillis, Jan Swevers, Wilm Decre, Goele Pipeleers</i>	
IMPROVING THE ROBUSTNESS IN MOTION PLANNING OF FLEXIBLE SYSTEMS THROUGH STRUCTURAL MODIFICATION: A CASE STUDY	138
<i>Paolo Boscariol, Dario Richiedei, Iacopo Tamellin, Alberto Trevisani</i>	
MODEL-FREE DETECTION OF PENETRATION AND AUTOMATIC STOP CONTROL IN DENTAL IMPLANT SURGERY BASED ON DIFFERENTIAL VALUE OF TORQUE	144
<i>Yusuke Kido, Hiromasa Kawana, Seiji Asoda, Takahiro Nozaki, Toshiyuki Murakami</i>	
MODELING OF A CLAMPING-BASED PIEZO ACTUATOR IN TRIANGULAR CONFIGURATION.....	150
<i>Stefan Krebs</i>	
DYNAMIC MODEL OF A PIEZOELECTRIC WALKING DRIVE.....	157
<i>Andreas Zurcher, Timon Raiser, Soren Hohmann</i>	
MOTION-COPYING SYSTEM WITH COMPENSATION OF ENVIRONMENTAL CHANGES FOR CALLIGRAPHY ROBOT.....	164
<i>Ryotaro Kobayashi, Seiichiro Katsura</i>	

ANALYSIS AND COMPARISON OF BACK-FORWARD DRIVABILITY CONTROL USING LOAD-SIDE SENSORS FOR HUMAN-ROBOT INTERACTION	170
<i>Yusuke Kawai, Juan Padron, Yuki Yokokura, Kiyoshi Ohishi, Toshimasa Miyazaki</i>	
MODELING OF A LINEAR VARIABLE STRUCTURED ELASTIC ACTUATOR CONSIDERING MODAL TRANSITION OF ELECTROMAGNETIC CLUTCH.....	175
<i>Masaki Takeuchi, Seiichiro Katsura</i>	
FORCE-BASED TWO-CHANNEL BILATERAL CONTROL FOR POSITION/VELOCITY CONTROLLED ROBOTS.....	181
<i>Yuki Nagatsu, Hideki Hashimoto</i>	
LOCALIZATION OF PALLETS ON SHELVES IN A WAREHOUSE USING A WIDE-ANGLE CAMERA.....	187
<i>Yasuyo Kita, Ryuichi Takase, Tatsuya Komuro, Norihiko Kato, Nobuyuki Kita</i>	
NEGATIVE QUADRANT GLITCH SUPPRESSION OF BALL-SCREW-DRIVEN STAGE BY INITIAL VALUE COMPENSATION WITH ADDITIONAL INPUT	195
<i>Takumi Hayashi, Hiroshi Fujimoto, Yoshihiro Isaoka, Yuki Terada</i>	
SPEED-UP OF NONLINEAR MODEL PREDICTIVE CONTROL FOR ROBOT MANIPULATORS USING TASK AND DATA PARALLELISM	201
<i>Alejandro Astudillo, Joris Gillis, Goele Pipeleers, Wilm Decre, Jan Swevers</i>	
SHOOTING METHODS FOR IDENTIFICATION OF NONLINEAR STATE-SPACE GREY-BOX MODELS	207
<i>Andras Retzler, Jan Swevers, Joris Gillis, Zsolt Kollar</i>	
MOTION CONTROL FOR AERIAL AND GROUND VEHICLE AUTONOMOUS PLATOONING	213
<i>Emanuele Venzano, Hugo Pousseur, Alessandro Correa Victorino, Pedro Castillo Garcia</i>	
MOTION CONTROL AUTO-TUNING IN ELEVATOR.....	219
<i>Janne Salomaki</i>	
IMPROVEMENT AND ANALYSIS OF POSITION AND SPEED ESTIMATOR IN LOW SPEED RANGE FOR IPMSM BASED ON DISTURBANCE OBSERVER	225
<i>Ryosuke Nakatsuka, Takahiro Nozaki</i>	
PERFORMANCE EVALUATION OF FORCE CONTROL AND REACTION FORCE ESTIMATION IN FORCE SENSORLESS HYBRID CONTROL FOR WORKSPACE BASED CONTROLLER.....	231
<i>Keita Shimamoto, Toshiyuki Murakami</i>	
DESIGN OF FEEDFORWARD CONTROLLER USING AIRFRAME'S VELOCITY FOR CONTACT FORCE CONTROL OF PROPELLER DRIVEN SYSTEM.....	237
<i>Masaya Inukai, Daisuke Yashiro, Kazuhiro Yubai, Satoshi Komada</i>	
A DECOUPLING SCHEME FOR FORCE CONTROL IN COOPERATIVE MULTI-ROBOT MANIPULATION TASKS.....	243
<i>Luca De Pascali, Sebastian Erhart, Luca Zaccarian, Biral Francesco, Sandra Hirche</i>	
PERFORMANCE IMPROVEMENT OF BILATERAL TELEOPERATION WITH HYDRAULIC ACTUATOR BY FRICTION COMPENSATION	250
<i>Yuki Saito, Hiroshi Asai, Tomoya Kitamura, Wataru Iida, Takahiro Nozaki, Kouhei Ohnishi</i>	

PEAK AMPLITUDE-CONSTRAINED EXPERIMENT DESIGN FOR FRF IDENTIFICATION OF MIMO MOTION SYSTEMS	256
<i>Nic Dirkx, Marcel Bosselaar, Tom Oomen</i>	
A CORNER SMOOTHING APPROACH FOR CNC MACHINES BASED ON n^{3D} SPLINES	262
<i>Andrea Tagliavini, Corrado Guarino Lo Bianco</i>	
GAUSSIAN PROCESS POSITION-DEPENDENT FEEDFORWARD: WITH APPLICATION TO A WIRE BONDER	268
<i>Max Van Haren, Maurice Poot, Dragan Kostic, Robin Van Es, Jim Portegies, Tom Oomen</i>	
A GAUSSIAN PROCESS APPROACH TO MULTIPLE INTERNAL MODELS IN REPETITIVE CONTROL	274
<i>Noud Mooren, Gert Witvoet, Tom Oomen</i>	
CONTROL OF AN OVERACTUATED NANOPositionING SYSTEM WITH HYSTERESIS BY MEANS OF CONTROL ALLOCATION	280
<i>Renzo Seminario, Christian Schmitt, Christoph Weise, Johann Reger</i>	
ANALYSIS OF POWER AMPLIFIER CONTRIBUTION TO THE PRECISION OF MOTION SYSTEMS	288
<i>Marziyeh Hajiheidari, Duo Xu, Jeroen Van Duivenbode, Bas Vermulst, Mircea Lazar</i>	
GENERALIZATION OF ILC FOR FIXED ORDER REFERENCE TRAJECTORIES USING INTERPOLATION	294
<i>Max Bolderman, Gerben Erens, Mircea Lazar, Hans Butler</i>	
SYSTEMATIC FEEDBACK CONTROL DESIGN FOR SCATTERED LIGHT NOISE MITIGATION IN VIRGO'S MULTISAS	300
<i>Mathyn Van Dael, Gert Witvoet, Bas Swinkels, Tom Oomen</i>	
ROBUST CONTINUOUS FINITE-TIME TRACKING CONTROL WITH FINITE-TIME OBSERVER FOR A STEWART PLATFORM	306
<i>Nithin Xavier, Bijnan Bandyopadhyay, Johann Reger, Lars Watermann</i>	
HAPTIC FEEDBACK ROVER NAVIGATION BASED ON POSITIONAL GAIN ADJUSTING BILATERAL CONTROL	311
<i>Rikuta Mazaki, Sota Shimizu, Tomonoti Yamazaki, Hokuto Kurihara, Naoki Motoi, Roberto Oboe, Nobuyuki Hasebe, Tomoyuki Miyashita</i>	
SLIDING MODE CONTROL WITH DISTURBANCE ESTIMATION FOR UNDERWATER ROBOT	317
<i>Naoki Motoi, Daigo Hirayama, Fumito Yoshimura, Adham Sabra, Wai-Keung Fung</i>	
EVALUATION OF TORQUE-SENSORLESS CONTROL FOR A KNEE EXOSKELETON USING BACK-DRIVABLE ACTUATORS	323
<i>Kenichiro Mori, Yasutaka Fujimoto</i>	
ESTIMATION OF JACOBIAN MATRIX WITHOUT ACCELEROMETER ON OMNI-DIRECTIONAL MOBILE WALKER	329
<i>Kentaro Ominato, Toshiyuki Murakami</i>	
EVALUATING THE EQUIVALENCE BETWEEN NONLINEAR FRICTION AND BACKLASH IN TWO-INERTIA SYSTEMS	335
<i>Juan Padron, Yuki Yokokura, Kiyoshi Ohishi, Toshimasa Miyazaki, Yusuke Kawai</i>	

ANALYSIS OF THE RELATIONSHIP BETWEEN CALCIUM ION CONCENTRATION RATIO AND BEHAVIOR IN NEURAL ACTIVITY OF THE BRAIN	341
<i>Ryota Sunami, Yasue Mitsukura</i>	
AUTOMATIC DECELERATION DETECTION SYSTEM FROM FETAL HEART RATE OBTAINED BY CTG	346
<i>Hiroko Yamamoto, Yasue Mitsukura</i>	
DEVELOPMENT OF CAPACITIVE COUPLED ELECTROCARDIOGRAPH IN THE STATE OF WEARING CLOTHES	352
<i>Naoki Ishiyama, Ryoto Fujita, Yuki Nagatsu, Hideki Hashimoto</i>	
MODELING AND IDENTIFICATION OF HYSTERESIS IN ROBOT JOINTS WITH CYCLOIDAL DRIVES.....	358
<i>Patrick Mesmer, Patrick Nagel, Armin Lechler, Alexander Verl</i>	
A FEEDBACK CONTROL SCHEME FOR IMPROVING PATH ACCURACY OF INDUSTRIAL MANIPULATORS BASED ON GEARBOX OUTPUT SENSING.....	364
<i>Silke Klose, Arne Wahrburg</i>	
TWO-DEGREE-OF-FREEDOM ROBUST FEEDBACK CONTROL OF A SLIDING GATE AUTOMATION	370
<i>Daniel Cunico, Angelo Cenedese, Luca Zaccarian, Mauro Borgo</i>	
MULTI-STAGE OPTIMAL CONTROL PROBLEM FORMULATION FOR DRONE RACING THROUGH GATES AND TUNNELS	376
<i>Mathias Bos, Wilm Decre, Jan Swevers, Goele Pipeleers</i>	
DEVELOPMENT OF A FLEXIBLE LINK SETUP FOR AN ADVANCED LINEAR CONTROL THEORY COURSE	383
<i>Laurens Jacobs, Wilm Decre, Jan Swevers, Goele Pipeleers</i>	
SIMPLIFIED WHEEL SLIP MODELING AND ESTIMATION FOR OMNIDIRECTIONAL VEHICLES.....	389
<i>Bastiaan Vandewal, Joris Gillis, Goele Pipeleers, Jan Swevers</i>	
AN OPTIMAL TORQUE DISTRIBUTION STRATEGY USING EFFICIENCY MAPS OF FRONT AND REAR DRIVETRAIN FOR ELECTRIC VEHICLES.....	396
<i>Kiho Jeon, Jung Hyun Choi, Sehoon Oh</i>	
A UNIFIED ROBUST MOTION CONTROLLER SYNTHESIS FOR COMPLIANT ROBOTS DRIVEN BY SERIES ELASTIC ACTUATORS	402
<i>Emre Sariyildiz</i>	
DESIGN CONSTRAINTS OF DISTURBANCE OBSERVER-BASED MOTION CONTROL SYSTEMS ARE STRICTER IN THE DISCRETE-TIME DOMAIN	408
<i>Emre Sariyildiz</i>	
VELOCITY AND ATTITUDE CONTROL OF QUADCOPTER WITH SUSPENDED-PAYLOAD USING DISTURBANCE OBSERVER WITH PAYLOAD INCLINATION SUPPRESSION.....	414
<i>Taketo Sugaya, Toshiyuki Murakami</i>	
FORCE CONTROL AT ARBITRARY POSITION OF MANIPULATOR BASED ON ESTIMATED CONTACT STATE BY FORCE/TORQUE SENSOR INSTALLED AT BASE FRAME	420
<i>Hinako Handa, Takahiro Nozaki</i>	

RECOGNITION OF ENVIRONMENTAL IMPEDANCE CONFIGURATION BY NEURAL NETWORK USING TIME-SERIES CONTACT STATE RESPONSE.....	426
<i>Kazuki Yane, Takahiro Nozaki</i>	
CENTROIDAL MOMENTUM OBSERVER: TOWARDS WHOLE-BODY ROBUST CONTROL OF LEGGED ROBOTS SUBJECT TO UNCERTAINTIES	432
<i>Dilay Yesildag Oral, Duygun Erol Barkana, Barkan Ugurlu</i>	
ESTIMATING ENVIRONMENT PARAMETERS FOR TELEOPERATION SYSTEM WITH TIME DELAY	438
<i>Fatimah Jabbar Majeed, Hafiz Huzaiifa Azeem, Eray A. Baran</i>	
A NEW ARTIFICIAL POTENTIAL FIELD BASED GLOBAL PATH PLANNING ALGORITHM FOR MOBILE ROBOT NAVIGATION	444
<i>Hamzah Al Jabari, Abdulrahman Alobahji, Eray A. Baran</i>	
OPERABILITY IMPROVEMENT OF HUMAN-ROBOT COLLABORATION BY HUMAN-ADAPTIVE IMPEDANCE CONTROL BASED ON HUMAN ARM STIFFNESS ESTIMATION	450
<i>Miho Shimizu, Misaki Hanafusa, Jun Ishikawa</i>	
TOWARDS A LOW-COST ROBOT NAVIGATION APPROACH BASED ON A RGB-D SENSOR NETWORK.....	458
<i>Massimiliano Bertoni, Stefano Michieletto, Giulia Michieletto</i>	

Author Index