# **2011 IEEE International Conference on Mechatronics and** Automation

(ICMA 2011)

Beijing, China 7-10 August 2011

Pages 3/: 52



**IEEE Catalog Number: CFP11839-PRT ISBN**:

978-1-4244-8113-2

## Copyright © 2011 by the Institute of Electrical and Electronic 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 publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.

IEEE Catalog Number: CFP11839-PRT ISBN 13: 978-1-4244-8113-2

ISSN: 2152-7431

#### **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



## **Table of Contents**

MA1-1	Organized Session: IMS for Innovation	
	Presentation of Button Repulsive Sensations on Touch Screen Using SMA Wires Muhamad Hafiz, Hideyuki Sawada	1
	Global Program for Collaborative Research, Development, and Innovation: Introduction to IMS International Fred-Holger Günther, Daniel Nagy	7
	A Service-Oriented Global Manufacturing Technology Platform for Research, Development and Innovation: Activity of IMS International Daniel Nagy	12
	Future IMS and NanoDevices George Kotrotsios	17
	On IMS with Human Factor From HUTOP to New Field Hiroyasu Koshimizu, Seiji Hata	22
	History and Review of the IMS (Intelligent Manufacturing System)  Hideo Setoya	30
MP1-1	Kinematics of Manipulators	
	Configuring Kinematically Redundant Robotic Manipulators to Increase Effective Task-Specific Motion Resolution  Frank L. Hammond III	34
	Kinematics Analysis of Manipulator of Environment-Contacting Object with Free-Joint-Structure Yasumichi Aiyama, Kazuki Sato	40
	Algebraic-elimination Based Solution of Inverse Kinematics for a Humanoid Robot Finger Ming-Tzong Lin, Hong-Bo Lin, Chung-Ching Liu, Ying-Lung Lin, Che-Hau Wu, Cheng-Wei Tung	46
	A Comparison Study of Three Screw Theory Based Kinematic Solution Methods for the Industrial Robot Manipulators  Emre Sariyildiz, Hakan Temeltas	52
	Structural Analysis of Steel-Cable-Driven Multi-Joint Robot Manipulator Jianjun Yuan, Weijun Zhang, Yongtao Song, Wan Yan	58
	Design and Workspace Analysis of a Light Weight and High Stiffness Arm Jing Li, Qiang Huang, Zhangguo Yu, Wei Xu, Xuechao Chen, Gan Ma	64
MP2-1	Mechatronic Device I	
	Optimization of a Completely Decoupled Flexure-Based Parallel XY Micro-motion Stage	69

Jiming Huang, Yangmin Li, Xinhua Zhao

Development of a Micromirror Based Laser Vector Scanning Automotive HUD Fan Chao, Siyuan He, James Chong, Ridha Ben Mrad, Lei Feng	75
Novel Design of a Three DOFs MEMS-based Precision Manipulator  Min Pan, Zhongzhe Chi, Dan Zhang	80
Influence of the Navier Boundary Wall Slip on Flow Patterns in Micro-scale Cavity Zhaomiao Liu, Guobin Wang, Feng Shen	86
Mobile Robot Autonomous Navigation Using MEMS Gyro North Finding Method in Global Urban System Yuanlong Wei, Mincheol Lee	91
Micro/nano Displacement Measurements Using a Novel Contact Probe-Based FBG Sensing System	97
Lijuan Chen, Xiaohuai Chen, Yetai Fei, Fangfang Liu	
MA1-2 Medical & Rehabilitation System	
Motorized Facilitated Ankle Stretching Fan Gao	102
Development of a Novel Robot-Assisted Catheter System with Force Feedback Xu Ma, Shuxiang Guo, Nan Xiao, Jian Guo, Shunichi Yoshida, Takashi Tamiya, Masahiko Kawanishi	107
Design and Development of a Hand Rehabilitation Robot for Patient-cooperative Therapy Following Stroke  Yili Fu, Qinchao Zhang, Fuhai Zhang, Zengkang Gan	112
Structure Synthesis and Optimization of a Supporting Medical Manipulator for Vascular Interventional Surgery  Xing-tao Wang, Xing-guang Duan, Qiang Huang, Hong-hua Zhao, Yue Chen, Chao Chen	118
Minimally Invasive Vascular Interventional Surgical Robot System Xue Yang, Hongbo Wang, Lin Yuan, Ning Du, Zengguang Hou	124
Design of Intravenous Infusion Monitoring and Alarm System Based on Wireless Communication Technology  Jianwen Cui, Han Zhang	130
MP1-2 Mobile & Walking Robots	
A Study on Teleoperation System for a Hexapod Robot— Development of a Prototype Platform — Masamitsu Kurisu	135
Experimental Study and DEM Analysis on Rigid Driving Wheel's Performance for Off-Road Vehicles Moving on Loose Soil Runhuai Yang, Min Xu, Xu Liang, Shiwu Zhang, Yong Cheng, Hongcheng Xu, Jie Yang	142

Dynamic Rotational Walking Motion on Inclined-plane with Posture Optimization by Genetic Algorithms Chayooth Theeravithayangkura, Tomohito Takubo, Kenichi Ohara, Yasushi Mae, Tatsuo Arai	148
Analysis and Modeling of Slip for a Five-Wheeled Mobile Robot (WMR) in an Uneven Terrain Ozoemena A Ani, He Xu, Gang Zhao	154
Preliminary Research of a Novel Soft Robot with Three Locomotion Modes Yong Du, Min Xu, Erbao Dong, Qin Yan, Shiwu Zhang, Jie Yang	160
Design and Development of Manual Wheelchair with Obstacle-crossing Capability Xuwei Guo, Shenghai Hu, Lixia Ying	166
MP2-2 Nano Mechatronics	
Towards Automated AFM-based Nanomanipulation in a Combined Nanorobotic AFM/HRSEM/FIB System  M Bartenwerfer, S Fatikow, R Tunnell, U Mick, C Stolle, C Diederichs, D Jasper, V Eichhorn	171
Automated Alignment, Focussing and Control of Nanomanipulators in Microassembly Workcell Himanshu DuttSharma, Sachin Bhardwaj, Rohit KumarSingh, Gaurav Singh Naruka, Amit Tholia	177
Directed Nanorobot-based Handling of Single Nanowires  Malte Bartenwerfer, Sergej Fatikow	183
Hysteresis Modeling and Inverse Feedforward Control of an AFM Piezoelectric Scanner Based on Nano Images Hui Tang, Yangmin Li, Xinhua Zhao	189
A 3D Stick-Slip Nanopositioner for Nanomanipulation Weibin Rong, Shizhong Zhang, Miao Yu, Lining Sun	195
Design of Hardware and Software for a New Capillary Rheometer Heping Song, Chengquan Hu, Guangyu Zhao, Yuanbo Xu, Lifeng Wang	200
MA1-3 Biomedical Mechatronics I	
Feasibility Study for a Novel Robotic Catheter System  Jian Guo, Shuxiang Guo, Nan Xiao, Xu Ma, Shunichi Yoshida, Takashi Tamiya, Masahiko Kawanishi	205
A Centrifugal Lab-in-a-tubing Platform Enabling Automatic Point-of-care Blood Diagnostics Tingjie Li, Qiuquan Guo, Limin Zhang, Jun Yang	211
Segmentation of Skin Cancer Images Based on Gradient Vector Flow (GVF) Snake Md. Khalad Abu Mahmoud, Adel Al-Jumaily	216
Apply RRT-based Path Planning to Robotic Manipulation of Biological Cells with Optical Tweezer Tao Ju, Shuang Liu, Jie Yang, Dong Sun	221
Nanoindentation Experiment and Modeling for Biomechanical Behavior of Red Blood Cell Qingsheng Yang, Weiwei Li, Zhiyuan Liu, Luodan Su	227

Wireless Power Transfer System for Capsule Endoscopy based on Strongly Coupled Magnetic Resonance Theory  Xuelin Fang, Hao Liu, Guiyang Li, Qi Shao, Hongyi Li	232
MP1-3 Biomedical Mechatronics II	
Control Method for Powered Ankle Prosthesis via Internal Model Control Design Ryoichi Suzuki, Takayuki Sawada, Nobuaki Kobayashi, Eberhard P. Hofer	237
Design of a 3-axial Force/Torque Sensor for Arthroscopy Force Sensing Ze Cui, Zengjun Han, Hongwei Pan, Yanming Shao, Danjie Zhu	243
Experimental Investigation of the Small Intestine's Viscoelasticity for the Motion of Capsule Robot Renjia Tan, Hao Liu, Gang Su, Cheng Zhang, Hongyi Li, Yuechao Wang	249
Numerical Simulation of Blood Flow in Blalock-Taussig Shunt for Hypoplastic Left Heart Syndrome  Xiaojun Zhang, Yun Cheng, Xiaoyang Li	254
Design of a Novel Master-Slave Robotic System for Minimally Intravascular Invasive Surgery Peng Zhang, Shichao Yu, Ying Hu, Xin Ma, Jianwei Zhang	259
Novel Approach of Ulcer Prevention based on Pressure Distribution Control Algorithm Jalloul Elfehri, François Boussu, Vladan Koncar, Christian Vasseur	265
MP2-3 Biomedical Control System	
Adaptive Controller for Motion Control of a Seated Walking Training Machine Yuto Watanabe, Shuoyu Wang, Renpeng Tan, Yinlai Jiang, Kenji Ishida, Masakatsu Fujie	271
Power Assistance for Human Elbow Motion Support Using Minimal EMG Signals with Admittance Control Chi Zhu, Shota Shimazu, Masataka Yoshioka, Tomohiro Nishikawa	276
Jacobian Analysis for Parallel Mechanism Using on Human Walking Power Assisting Yong Yu, Wenyuan Liang, Yunjian Ge	282
Measurement of Interface Pressure Applied by Medical Compression Bandages JawadAl Khaburi, Abbas ADehghani-Sanij, E. Andrea Nelson, Jerry Hutchinson	289
Optimal Combination of Channels Selection Based on Common Spatial Pattern Algorithm Mingai Li, Jianyong Ma, Songmin Jia	295
Motion Control of Intelligent Wheelchair Based on Sitting Postures  Jinhui Fan, Songmin Jia, Xiuzhi Li, Wei Lu, Jinbo Sheng, Liwen Gao, Jun Yan	301
MA1-4 Intelligent Control I	
An Approach to Simultaneous Realization of Neutral Steer and Sideslip Reduction for Four-Wheeled Electric Vehicles  Guisheng Zhai, Masayuki Naka, Tomoaki Kobayashi, Joe Imae	307

	Real-time Dynamic Power Management of Electrically Assisted Bicycle Stone Cheng, Ivan Huang	313
	An Improved 3D Modeling of Water-jet Propellers for a Spherical Underwater Robot Zhaoyi Liu, Shuxiang Guo, Hui Li, Xichuan Lin	319
	Adaptive Controller for Omni-directional Walker: Improvement of Dynamic Model Renpeng Tan, Shuoyu Wang, Yinlai Jiang, Tianyou Chai, Kenji Ishida, Masakatsu G. Fujie	325
	Adaptive Sliding Mode Control of MEMS Triaxial Gyroscope Based on RBF Network Juntao Fei, Hongfei Ding, Yuzheng Yang	331
	RBF Based Discrete Terminal Sliding Mode Control for Flight Simulator Yaqing Chen, Weihong Wang	337
MP1-4	Intelligent Control II	
	A Composite Algorithm for Flow Rate Reduction and Stable Body Trajectory Generation in a Hydraulic Actuated Quadruped Robot with Kinematic Redundancy Taeju Kim, Sangdeok Park, Byung-Ju Yi	343
	H∞ Control of Active Magnetic Bearings using Closed Loop Identification Model Junfeng Chen, Kun Liu, Kai Xiao	349
	The Research of Stability Performance of 4WD Vehicles Basing on Electric Wheels Torque Control  Jianguo Song, Pingping Xu	354
	Advanced Inversion Control for a Hypersonic Vehicle Based on PSO and Arranged Transient Process  Zhiqiang Pu, Xiangmin Tan, Jianqiang Yi, Guoliang Fan	359
	A Closed-loop Method to Generate Fast C-start for a Robotic Fish Zongshuai Su, Junzhi Yu, Min Tan, Jianwei Zhang	365
	Model Analysis and Active Vibration Control for Space Deployable Truss Type Mast Haojiang Zhao, Rongqiang Liu, Hongwei Guo, Zongquan Deng	371
MP2-4	Control Theory I	
	Resonant Frequency Band Estimation using Adaptive Wavelet Decomposition Level Selection <i>M.F. Yaqub, I. Gondal, J. Kamruzzaman</i>	376
	UKF Parameter Optimization Method Using BP Neural Network for Super-Mini Aerial Vehicles Guoyu Zuo, Xiaoqing Zhu, Kai Wang, Xiang Liu	382

Temperature Control System of Air-conditioning Based on the Fuzzy Theory Jing JIANG, Xuesong ZHANG	387
Self-evolution Fuzzy Chaotic Neural Network and Its Application Mo Tang, Xiaojun Bi, Kejun Wang	392
A Control System of a Ping-pong Robot Arm based on Fuzzy Method Xiaowen Yu, Jing Xu, Shaoli Liu, Ken Chen	398
Fuzzy Tuning Manipulation Control of a Space Robot with Passive Flexible Solar Panels Payam Zarafshan, S. Ali. A. Moosavian	404
MA1-5 Robot Control I	
The Efficacy of Symmetric Cognitive Biases in Robotic Motion Learning Daisuke Uragami, Tatsuji Takahashi, Hisham Alsubeheen, Akinori Sekiguchi, Yoshiki Matsuo	410
An Energy Saving Open-Loop Control Technique for Flexible Manipulators  Akira Abe, Kazuma Komuro	416
Tracking Control of Mobile Robot Using ANFIS  Masoud Imen, Mohammad Mansouri, Mehdy Aliyari Shoorehdeli	422
Anti-Swing Control of Underactuated Overhead Crane System Using Multiple Lyapunov Functions  Aydin Yesildirek	428
Development of Learning Control in Robots  Hu Su, De Xu, Yanlong Huang	433
Sliding Mode Adaptive Control for Flying Robot Based on Recurrent CMAC Algorithm Hongjun DUAN, Deying GU	440
MP1-5 Robot Control II	
Singularity Analysis of 6DOF Stäubli© TX40 Robot Masoud Vaezi, Farzad Cheraghpour Samavati, Hesam Eddin Shoori Jazeh, S.Ali A. Moosavian	446
A High Speed Robot Vision System with GigE Vision Extension Wenhao He, Kui Yuan, Han Xiao, Zhengdong Xu	452
Dimension Optimization Design of an Under-Restrained 6-DOF Four-Cable-Driven Parallel Manipulator based on Least Square-Support Vector Regression Xiaoling Jiang, Yijian Huang, Yaqing Zheng	458
Position Control of a 2DOF Underactuated Planar Flexible Manipulator Wei Chen, Yueqing Yu, Xinhua Zhao, Lianyu Zhao, Qiyuan Sun	464
Automatic Tracking of Human-Body Using a 3 DOF Robotic Lamp Yun-Seok Lee, Dae-Keun Yoon, Jong-Tae Seo, Byung-Ju Yi	470
Modular Design for Small Humanoid Robots based on Robbus Qian Xu, Qiang Huang, Xiaopeng Chen, Wei Xu	477

### MP2-5 Robotic Vision

	Sung-Tae An, Jeong-Jung Kim, Ju-Jang Lee	403
	Object Detection by Parts Using Appearance, Structural and Shape Features  Li He, Hui Wang, Hong Zhang	489
	Place Recognition based on Latent Dirichlet Allocation  Jinfu Yang, Yangli Wang, Mingai Li, Min Song	495
	A Bilinear Model based Solution to Object Pose Estimation with Monocular Vision for Grasping Zhicai Ou, Wei Liu, Jianhua Su	501
	Efficient Face Detection and Tracking with Extended CAMSHIFT and Haar-Like Features Lae-Kyoung Lee, Su-Yong An, Se-Young Oh	507
	Real-time Human Detection based on Cascade Frame Zhihui Li, Chunyan Shao, Di Sun	514
MA1-6	Dynamics & Cooperative Control for Robots	
	Detailed Slip Dynamics for Nonholonomic Mobile Robotic System S. Nandy, S.N. Shome, R. Somani, T. Tanmay, G. Chakraborty, C.S. Kumar	519
	A Potential Field Method-based Extension of the Dynamic Movement Primitive Algorithm for Imitation Learning with Obstacle Avoidance Huan Tan, Erdem Erdemir, Kazuhiko Kawamura, Qian Du	525
	Radio Source Search Using Force Field Vectors Weighted by Received Signal Strength Gradients  Xiaochen Zhang, Yi Sun, Jizhong Xiao	531
	Dynamical Task Allocation and Reallocation Based on Body Expansion Behavior for Multi-robot Coordination System  Guanghui Li, Yusuke Tamura, Hajime Asama	537
	A Distributed Multi-Robot Formation Control Method Yuan Li, Wei Zou, Feng Wen, Kui Yuan	543
	Image-Guided Robotic Mastoidectomy Using Human-Robot Collaboration Control Hoon Lim, Jung-Min Han, Jaesung Hong, Byung-Ju Yi, Seung Hwan Lee, Jin Hyeok Jeong, Nozomu Matsumoto, Masamichi Oka, Shizuo Komune, Makoto Hashizume	549
MP1-6	Mechatronic Control Systems	
	Micro Gap Measurement by Vibration Mode for Needle-type dispenser Kazuki Hirose, Yuuka Irie, Shinnosuke Hirata, Hisayuki Aoyama	555
	A De-Coupled Vertical Controller for Micro-Autonomous Underwater Vehicles (µAUVs) Simon A. Watson, Peter N. Green	561

	The Design and Technical Challenges of a Micro-Autonomous Underwater Vehicle (µAUV) Simon A. Watson, Dominic J. P.Crutchley, Peter N Green	567
	Dynamic Analysis and PID Control for a Quadrotor  Jun Li, Yuntang Li	573
	Phase-Shift Control in Two-Beam Laser Interference Lithography Jia Xu, Wei Zhang, Lanjiao Liu, Zuobin Wang, Zhengxun Song, Zhankun Weng, Zhen Hu, Jin Zhang, Yong Yue, Dayou Li	579
	The Dynamics Study of the Stick-slip Driving System based on LuGre Dynamic Friction Model Bowen Zhong, Lining Sun, Liguo Chen, Zhenhua Wang	584
MP2-6	S Sensing Calibration	
	End Point Tracking for a Moving Object with Several Attention Regions by Composite Vision System	590
	Kotaro Nagahama, Tomohiro Nishino, Mitsuharu Kojima, Kimitoshi Yamazaki, Kei Okada, Masayuki Inaba	
	Least-Square Based Self-calibration of Two-Dimensional Ultra-Precision Stages Yu Zhu, Chuxiong Hu, Jinchun Hu	597
	Study on the Space Burst Point Test System Used in Proximity Fuze Projectile Jinping Ni, Tao Dong	603
	The Evaluation of Measurement Uncertainty for Laser Tracker based on Monte Carlo Method Jindong Wang, Junjie Guo, Hao Wang, Yufen Deng	608
	Ultrasonic Echoes Estimation Method using Genetic Algorithm Zhongzhu Liu, Xiaoguang Bai, Qinxue Pan, Yong Li, Chunguang Xu	613
	A Calibration Process for Tracking Upper Limb Motion with Inertial Sensors Hao Yang, Juntao Ye	618
MA1-7	' Organized Session: Image Processing I	
	Development of 3-D Position Measurement Method for a Round Hole T. Tsukada, K. Watanabe, M. Koide, M. Hirose, Y. Horie, Y. Yamagishi	624
	A Method for Noise Suppression in Image Morphing Using Co-occurrence Frequency Image Yosuke Nagasaka, Takayuki Fujiwara, Takuma Funahashi, Hiroyasu Koshimizu	630
	Liquid Crystal Lens with Electrically Controllable Focal Length Mao Ye, Bin Wang, Masaru Uchida, Satoshi Yanase, Shingo Takahashi, Susumu Sato	635
	Autonomous Robot Human Detecting and Tracking Based on Stereo Vision Songmin Jia, Liang Zhao, Xiuzhi Li, Wei Cui, Jinbo Sheng	640
	Moving Objects Detection based on Space Vector Difference Zhen Qian, Debao Huang, Xiaohui Mao	646

	Real-time Structured Light 3D Scanning for Hand Tracking Renju Li, Hongbin Zha	652
MP1-7	Organized Session: Image Processing II	
	Image Quality Evaluation based on Contrast Sensitivity Function Toshio Asano, Yuji Takagi, Takahiro Kondo, Jun Yao, Wei Liu	658
	Towel Mark Recognition System for Washing Cloth Handling System Tatsuya Hojoh, Seiji Hata, Junichiro Hayashi, Toshihiro Hamada, Hirotaka Hojoh	664
	Cutting Tool Wear Measurement by Using Active Contour Model Based Image Processing Guangxi Xiong, Jiancheng Liu, Adrian Avila	670
	Research on Intellectual Detection and Classification of Pork Freshness Based on SOM Neural Network Peiyuan Guo, Yan Fu, Fang Yuan, Man Bao	676
	Color Image Segmentation based on Watershed and Ncut of Improved Weight Matrix Xiaoli Xu, Zhimao Lu, Haiyan Li	681
	Finding Objects at Indoor Environment Combined with Depth Information Yongqiang Gao, Jianhua Zhang, Liwei Zhang, Ying Hu, Jianwei Zhang	687
MP2-7	Image Processing III	
	A Filtering Method for Generating DTM based on Multi-scale Mathematic Morphology Shuwei Li, Huabo Sun, Lei Yan	693
	Edge-Directed Interpolation Based on Canny Detector Yang Luo, Shanshan Liu, Huiyan Zhu	698
	A Level-set Model Driven by Bidimensional EMD for Sonar Image Segmentation Xiufen Ye, Lei Wang, Tian Wang, Gang Wang	703
	Structural Similar Patches for Nonlocal-means with Modified Robust M-estimator and Residual Images Bo Xiong, Zhouping Yin	709
	Scene Flow Based Stereo Augmentation Reconstruction Xiuzhi Li, Songmin Jia, Wei Cui, Jinhui Fan, Jinbo Sheng	715
	Translational Offset Detection Based on Far-Field Intensity for Grating Tiling Yanlong Huang, Zaojun Fang, De Xu, Min Tan, Lan Xia	721
TA1-1	Mechatronic Device II	
	Audio Near-Distance Directional Loudspeaker Technology for Portable Multimedia Devices Xuesheng Li, Limei Xu, Leon Xu	727

A Proposal of Optimization Methodology on Manufacturing Scheduling and Its Application into Actual Scale Problem in Semiconductor Manufacturing Shinji Kurose, Toshiya Kaihara, Nobutada Fujii	732
Underwater Experiments of a Water-jet-based Spherical Underwater Robot Xichuan Lin, Shuxiang Guo, Koujirou Tanaka, Seji Hata	738
The Kinematics Analysis For A Five DOF Serial-parallel Manipulator with RP-(2-RRU/1-RUU) Structure	743
Chenglong Lv, Ying Hu, Zhong Wan, Jianwei Zhang	
Research of Micro Removing Copper Foil of FCCL Assisted with Laser Jianwen Yuan, Jimin Chen, Chao He	749
Modeling of the PDMS Diaphragm Micropump Using EO Actuators Wei Wei, Shuxiang Guo	755
TP2-1 Organized Session: Human Assistive Technologies and Industrial Applications I	
Control of Myoelectric Prosthetic Hand Based on Surface EMG Chiharu Ishii, Akitoshi Harada, Takashi Nakakuki, Hiroshi Hashimoto	761
Online Collision and Occlusion Detection Based on 3D Cuboid Maps for a Daily Assistive Robot with a Tilting LRF	767
Kimitoshi Yamazaki, Masayuki Inada, Takemitsu Mori, Takashi Yamamoto	
Design of Downsized and Efficient Manufacturing Systems Nozomu Mishima, Kiwamu Ashida	773
Camera-based AGV Navigation System for Indoor Environment with Occlusion Condition Naoya Isozaki, Daisuke Chugo, Sho Yokota, Kunikatsu Takase	778
Analysis and Evaluation of Tennis Plays by Computer Vision Ryota Mukai, Toshio Asano, Hajime Hara	784
TA1-2 Novel Actuator System I	
A New Model of Hysteresis in Piezoelectric Actuators Issam M.Bahadur, James K. Mills	789
Development of a Novel Rotor-Embedded-Type Multidegree-of-Freedom Spherical Ultrasonic Motor	795
Bo Lu, Manabu Aoyagi, Hideki Tamura, Takehiro Takano	
Active-Passive Hybrid Actuators for Tracking and Focusing Motions in Optical Pickup Devices Kwong Wah Chan, Chien Yu Shen, Wei-Hsin Liao	801
Research and Development of Expert System for Permanent Magnet Retarder Design Lezhi Ye, Desheng Li, Bingfeng Jiao	807
Structure Design and Mechanical Characteristic Test of Cylindrical Ultrasonic Micromotor Jingshan Wang, Hua Zhu, Jianhui Zhang, Chao Chen	812

Accurate controlled Shape Memory Alloy Actuator for Minimally Invasive Surgery Zhenyun Shi, Da Liu, Cheng Ma, Depeng Zhao	817
TP2-2 Novel Actuator System II	
An Experimental System for Robotic Needle Biopsy of Lung Nodules with Respiratory Motion Yu Zhou, Kaarvannan Thiruvalluvan, Lukasz Krzeminski, William H. Moore, Zhigang Xu, Zhengror Liang	
Study of Leakage Model for Servo Valve Junhong Liu, Huapeng Wu, Heikki Handroos, Heikki Haario	831
A Multi-functional Magnetoelectric Sensor Based on Eddy Current in Cantilevere Piezoelectric Unimorph Bender Jiawei Zhang, Benoit Guiffard, Laurent Lebrun, Daniel Guyomar	ed 837
Experiment on Dual-chamber Parallel Piezoelectric Stack Pump for Electrorheological Fluids Jianfang Liu, Xuguang Sun, Guojun Liu, Xiaotiao Li, Yong Liu	842
Union Operation of PS and Its Engineering Application Method Xinqin Gao, Yan Li, Mingshun Yang, Yong Liu, Erbao Xu	847
A Novel Butterfly-Inspired Underwater Microrobot with Pectoral Fins Liwei Shi, Shuxiang Guo, Kinji Asaka	853
TA1-3 Organized Session: Robots for New Fields I	
Robots for New Fields Shigeoki Hirai	859
Cloth Handling System for Linen Supply Industry Seiji Hata, Hirotaka Hojoh, Masaaki Toda, Toshihiro Hamada	864
Autonomous Rice Field Operation Project in NARO Yoshisada Nagasaka, Katsuhiko Tamaki, Kentaro Nishiwaki, Masahiro Saito, Yutaka Kikuchi, Ky Kobayashi	870 ⁄o
Object Spatial Recognition for Service Robots: Where is the Front?  Lu Cao, Dipankar Das, Yoshinori Kobayashi, Yoshinori Kuno	875
Geometry Optimization of a New Hybrid Robot Manipulator  Jiman Luo, Dalong Wang, Yang Jiang	881
A Novel Shrimp Rover-based Mobile Robot for Monitoring Tunnel Power Cables Songyi Dian, Tao Liu, Yan Liang, Mengyu Liang, Wei Zhen	887
TP2-3 Organized Session: Robots for New Fields II	
A Robotic Assembly System Capable of Handling Flexible Cables with Connector Yasuo Kitaaki, Rintaro Haraguchi, Koji Shiratsuchi, Yukiyasu Domae, Haruhisa Okuda, Akio Noda	893

A Method of Simulating the Fusion of Speech and Facial Expression for Individuals Based on the GFFD Method  Shen Yue, Katsuhiro Kitajima	898
An Open Experiment of Mobile Robot Autonomous Navigation at the Pedestrian Streets in the City - Tsukuba Challenge - Shin'ichi Yuta, Makoto Mizukawa, Hideki Hashimoto, Hirofumi Tashiro, Tsuyoshi Okubo	904
Dynamics Analysis of the AFM Manipulator-Sample Interaction Using Nano-Contact Mechanics Models Khadijeh Daeinabi, Moharam Habibnejad Korayem	910
Research on a Development Hydraulic Servo Tele-robotics System Guang Wen, Mingde Gong, Hongyan Zhang	916
Cleaning Robot for Carbon Anode Block Based on Vision Inspection and Hybrid Force/Position Control  Junjie Yuan, Guangping He, Xiguang Huang	920
TA1-4 Control Theory II	
Vibration Control of Active Structures Using Hybrid PD/Repetitive Control Chi-Ying Lin, Chih-Ming Chang	926
Adaptive Hybrid Suppression Control of a Wheeled Mobile Robot with Active Flexible Members  Payam Zarafshan, S. Ali. A. Moosavian	932
Discrete-Time Zhang Neural Network and Numerical Algorithm for Time-Varying Linear Equations Solving Yunong Zhang, Bingguo Mu, Huicheng Zheng	938
Induction Compensation Control of Bearingless Induction Motor Wenshao Bu, Juanya Xiao, Lan Yuan, Shenghua Huang	944
A Novel Control Strategy for Five-phase Concentrated Full-pitch Windings Induction Motor under Open-phase Fault Peng Zhu, Xiaofeng Zhang, Mingzhong Qiao, Wei Cai, Jinghui Liang	950
Delay-dependent Stability Analysis for Time-delay Systems with Uncertain Parameters Yanhui Ai, Changhui Song, Xi Gong, Zongyong Tang, Zuoqiong Zhang	956
TP2-4 Control Application I	
An Innovative Cost Effective Approach towards Tension Control in Automated Filament Winding Composite Manufacturing  Trinankur Hazra, Jason Gu, Farid Taheri	961
Multi-Objective Evaluation based Optimizing Control Method for Shaft Furnace Roasting Process  Aijun Yan, Chunxiao Zhang, Zhe Xu, Pu Wang	967
Research on the Permanent Magnet using Comsol Multiplysics in Generator	972

Suli Wang, Liping Wen, Zhaoguo Qiu, Bin Wu, Cunfu He

High-Performance Coordinated Motion Control of High-Speed Biaxial Systems For Contouring Tasks With Comparative Experimental Investigations
Chuxiong Hu, Bin Yao, Qingfeng Wang, Yu Zhu

An Approach to Manage Over-constrained Mechatronic System in Teamwork
Ruixian Liu, Philippe Serré, Jean-Yves Choley

TA1-5 SLAM

Ground View-Based SLAM Using a Commercial Web Camera in Unstructured Indoor
Environments

**Environments** Su-Yong An, Lae-Kyoung Lee, Se-Young Oh, Jeong-Gwan Kang An Adaptive Data Association for Robotic SLAM in Search and Rescue Operation 997 Rex H. Wong, Jizhong Xiao, Samleo L. Joseph 1004 Lane Departure Estimation by Side Fisheye Camera Shigang Li, Hideki Oshima, Isao Nakanishi, Kikuo Fujimura 1010 Target Localization via Correlated Link Inference Renbing Kuang, Heping Song, Guoli Wang Mobile Robot Localization and Map Building Based on Laser Ranging and PTAM 1015 Jinbo Sheng, Shunichi Tano, Songmin Jia 1021 Extended Strong Tracking Filter SLAM Algorithm Feng Wen, Xiaojie Chai, Yuan Li, Wei Zou, Kui Yuan

## TP2-5 Robot Navigation I

1027 Stairway Segmentation Using Gabor Filter and Vanishing Point Danilo Cáceres Hernández, Kanghyun Jo 1033 A Novel Vehicle Navigation System Based on MSINS Feng Sun, Qian Li, Yueyang Ben, Wei Gao An Improved Adaptive Kalman Filtering Algorithm for Advanced Robot Navigation System 1039 based on GPS/INS Xiaochuan Zhao, Yi Qian, Min Zhang, Jinzhe Niu, Yuxiang Kou 1045 Study on Mobile Robot Navigation Based on Strategy of Blind Man Finding Way Feng Chen, Cong Ma, Weiguo Ma, Hairong Zhu, Jianhong Zhu, Longfang Yi 1050 **UAV-based Marine Mammals Positioning and Tracking System** Tiago Gaspar, Paulo Oliveira, Carlos Silvestre

#### TA1-6 Sensor Networks

Solutions for Connectivity-based Sensor Network Localization 1056

Dapeng Qiao, Grantham K.H Pang

Visual Tracking Based on Multiple Instance Learning Particle Filter Yu Song, Qingling Li	1063
Energy-Efficient Data Acquisition in Wireless Sensor Networks through Spatial Correlation Xun Li, Shiqi Tang, V Merrett Geoff, M White Neil	1068
Research of Wireless Sensor Networks for an Intelligent Measurement System Based on ARM Wenbin Huang, Guanglong Wang, Jianglei Lu, Fengqi Gao, Jianhui Chen	1074
Genetic Algorithm based Optimal Placement of PIR Sensor Arrays for Human Localization Guodong Feng, Min Liu, Xuemei Guo, Jun Zhang, Guoli Wang	1080
An Iteratively Reweighted Least Square Algorithm for RSS-based Sensor Network Localization  Dapeng Qiao, Grantham K.H. Pang	1085
TP2-6 Sensor Design I	
Design and Calibration of Sensing System for High-precision Meso-scale Friction Test Huadong Yu, Qingyong Shi, Yiquan Li, Jinkai Xu, Ying Xu	1093
Study on the Design Method of Giant Magnetostrictive Force Sensor Huifang Liu, Zhenyuan Jia, Fuji Wang, Fucai Zong	1098
Measurement and Identification of the Structure Parameters in the Four-Light-Screen Optical Target Hongwei Lu, Jinping Ni, Ying An	1104
Flexible Building Blocks: Modularized Design Concept of A Six-Axis Force/Torque Sensor Dangxiao Wang, Lei Fang, Mu Xu, Jiaqi Yu	1109
Design and Simulation of an Ultrasonic Flow Meter for Thin Pipe Yang Yu, Guanghua Zong	1115
Analysis of Star Tracker/Accelerometer Inertial Navigation System in Theory Yingbo Cai, Qiuying Wang, Xuetong Wei, Debiao Li	1120
TA1-7 Signal Processing I	
Analysis of Non-Stationary Electrocardiogram Signals Using Iterative Wavelet Decomposition Sherin M. Youssef	1125
Fast Self-tuning Weighted Measurement Fusion Kalman Filter for the ARMA Signal Chenjian Ran, Zili Deng	1131
Inspecting Integrity and Residual Stress of Plate by Ultrasonic Wave Qinxue Pan, Yong Li, Xiaoguang Bai, Chunguang Xu, Xiangchen Yang	1137
Prediction of Side-drilled Hole Signals in Anisotropic Cladding Component Xinyu Zhao, Zongxing Lu, Qinxue Pan, Zhipeng Shan, Xiaoguang Bai, Long Liu	1142

	Multichannel ARMA Signal Covariance Intersection Fusion Wiener Filter Yuan Gao, Wenjuan Qi, Zili Deng	1147
	Development of Scenes Drawing System for Urban Road Accidents  Yangshan Tang, Liying Wang	1152
TP2-7	Signal Processing II	
	Data Processing and Error Analysis of Two Way Satellite Time and Frequency Transfer Jiangmiao Zhu, Dong Han, Jisheng Guo	1158
	Experiment Research on the Metal Magnetic Memory in Gear Micro Crack Detection Chenhui Kang, Lingli Cui, Jianyu Zhang, Lixin Gao, Yonggang Xu	1163
	Flow Measurement Using High Speed Spectral Optical Coherence Tomography Zhenhe Ma, Yixiong Su	1168
	Code Acquisition Using the Locally Optimum Test Statistics in both Multiplicative and Additive Noises Feng Shen, Meng Gai, Zhaolong Wang, Zhiqiang Li	1174
	A Novel Target Tracking Algorithm Under Complex Background  Jingyu Cao, Weiyan Chai, Peizhi Liu	1179
	Multi-Class Imagery EEG Recognition Based on Adaptive Subject-Based Feature Extraction and SVM-BP Classifier  Mingai Li, Lin Lin, Songmin Jia	1184
WA1-1	Organized Session: Human Associative Technologies andIndustrial Applications II	
	A Robotic Extremities Muscle Rehabilitation System for Quadriplegia Dongxiao Wang, Xueshan Gao, Yunhui Liu	1190
	Virtual Reality Based Robotic Therapy for Stroke Rehabilitation: an Initial Study Huapeng Wu, Junhong Liu, Heikki Handroos, Barbara Miraftabi, Ari Heinonen, Sinikka Peurala, Ina Tarkka, Marko Rossi, Satu Nousiainen	1196
	Development of an Assistive Wheelchair Caster Unit for Step Climbing - Design and Construction of a unit - Sho Yokota, Takanori Ito, Tatsuya Yamaguchi, Daisuke Chugo, Hiroshi Hashimoto	1201
	Intelligent Tennis Wheelchair Control Method Based on Webots Platform Songmin Jia, Liwen Gao, Jinhui Fan, Jun Yan, Xiuzhi Li, Jinbo Sheng	1207
	Dynamic Modeling and Analysis of the Different Cavity-type Hydrostatic Slide Turntable Syetem  Hongling Ye, Xiaolong Zheng, Pin Wen	1213
	Proposal of Anthropomorphic Hand with Passive Warped Fingertip Hidenori Ishihara, Naoki Hirose, Shota Funaoka, Kazuo Morita, Tohru Miyake	1219

## WA2-1 Manufacturing Technology

The Experimental Test and FEA of a PKM(Exechon) in a Flexible Fixture Application for Aircraft Wing Assembly Mingdong Shang, Joe Butterfield	1225
Study of Competitiveness and Japanese Production Technology Okitoshi Tsunoda, Hiroki Nakano	1231
Research on the Mask Micro-transparent Defect Repair Assisted with UV Laser Min Wang, Jimin Chen	1237
A New Two-Phase Fluid Dispensing Technology for the Adhesive Distribution Peng Peng, Jianhua Zhang, Jinsong Zhang	1242
Design and Simulation on Surface Defect Inspection System of Micro Ring Parts Xiaozhou Li, Yan Li, Huadong Yu, Jinkai Xu, Zhanjiang Yu	1247
Research of Agile Virtual Enterprise Established Based on Combinatorial Optimization Model Tianrui Zhang, Tiantiao Yu, Wanshan Wang	1253
WP1-1 Humanoid & Biped Robot	
Force-Cooperative Guidance Design of an Omni-Directional Walking Assistive Robot Kai-Tai Song, Sin-Yi Jiang	1258
Modeling and Simulation of a Jumping Frog Robot  N.S Reddy, Ranjit Ray, S.N Shome	1264
A Passive Walking Strategy for a Biped Robot with a Large Mass Torso by a Spring and a Damper Yuta Hoshino, Chenglong Fu, Ken Chen	1269
BJR: A Bipedal Jumping Robot Using Double-Acting Pneumatic Cylinders and Torsion Springs Guoyu Zuo, Rongyi Sun, Guan Wang, Kai Wang	1275
Biped Walking Planning Using Extended Linear Inverted Pendulum Mode with a Continuous Moving ZMP  Xuechao Chen, Qiang Huang, Zhangguo Yu, Wei Xu, Jing Li, Gan Ma	1280
Object Manipulation by Two Humanoid Robots Using MTJ Control S. Ali A. Moosavian, Alireza Janati, M. Hamid Ghazikhani	1286
WP2-1 Human System Interaction & Interface	
User Directional Intention Recognition of an Omnidirectional Walking Support Walker Yinlai Jiang, Kenji Ishida, Shuoyu Wang, Takeshi Ando, Masakatsu G. Fujie	1291
Development of a Guide Robot Interacting with the User Using Information Projection - Basic System - Takuya Sasai, Yo Takahashi, Mitsunori Kotani, Akio Nakamura	1297

EmoLogus: Presentation of a Linguistically Based Model for Emotion Detection and Adaption to Another Context  Marc Le Tallec, Dominique Duhaut	1303
Preliminary Study to Evaluate Emi Emotional Interaction with Two Young Children Sebastien Saint-Aimé, Brigitte Le Pévédic, Dominique Duhaut	1309
Visio-haptic Simulation for Detection of Dental Cavity Profile Ge Yu, Dangxiao Wang, Yuru Zhang	1315
A Measurement and Control System based on USB Bus for Prosthetic Hand Ting Zhang, Jiang Li, Nan Li, Hong Liu	1321
WA1-2 Mechatronic Systems	
Optimal Mechanism Design of In-pipe Cleaning Robot Chang Doo Jung, Won Jee Chung, Jin Su Ahn, Myung Sik Kim, Gi Soo Shin, Soon Jea Kwon	1327
Stressed Nanomechanical Resonator Fabrication Utilizing Stiction Phenomena Hiroki Ashiba, Reo Kometani, Shin-ichi Warisawa, Sunao Ishihara	1333
Adaptive Sliding Mode Observer and Control Design for Biased Momentum Satellites Lin Zhao, Xin Yan, Yong Hao, Zhonghua Su	1339
Design and Optimization of Overall Structure for a Landing AUV Fei Liu, Hongwei Zhang, Bing Du	1345
Dynamic Analysis of Spherical 2-DOF Parallel Manipulator with Actuation Redundancy Yongquan Li, Lijie Zhang, Yuewei Niu	1350
Design of a Wireless Hybrid In-Pipe Microrobot with 3 DOFs Takuya Okada, Shuxiang Guo, Yasuhiro Yamauchi	1356
WA2-2 Mechanism Analysis I	
A Computationally Efficient Approach for Jacobian Approximation of Image Based Visual Servoing for Joint Limit Avoidance Indrazno Siradjuddin, T.M. McGinnity, Sonya Coleman, Laxmidhar Behera	1362
Model Updating for Disk-Rod-Fastening Rotor Based On DOE Guihua Dong, Minqing Jing, Heng Liu	1368
Design and Analysis of Flux Concentrating Permanent Magnet Disc Synchronous Motor for Direct Driving System  Jintao Liang, Shengdun Zhao, Jia Xie	1373
Dynamic Characteristics of Tower Structure Based on Finite Element Analysis Tianliang Liu, Deguang Shang, Chonggang Ren, Jingyang Nan	1379
WP1-2 Mechanism Analysis II	
Vision-Guided Robotic Assembly Using Uncalibrated Vision Biao Zhang, Jianjun Wang, Gregory Rossano, Carlos Martinez	1384

Dynamic Modeling of Analysis Chunzhi Zhang, Guoying	f Scraper Conveyor Sprocket Transmission System and Simulation g Meng	1390
Numerical Simulation Nana Zhang, Yibing Liu,	of Unbalance Vibration for 600MW Supercritical Steam Turbine Hongwen An	1395
•	ower Subsystem in Shock Simulation System for Shipborne Weapons ii He, Chaoyuan Cai, Guangling Dong, Qiang Li	1400
Hydrodynamic Analysi Tian Wang, Xiufen Ye, L	is and Optimization for Dish Shaped Underwater Robot ei Wang, Chao Zhang	1406
2-DOF Kinematic XY S Weijun Wang, Changsoo	Stage Design Based on Flexure Element o Han, Hyeunseok Choi	1412
WP2-2 Modeling & Analysis	<b>S</b>	
Analysis of Bionic Hyd Jian'an Xu, Na Yan, Min	drofoil Propulsive Performance  gjun Zhang	1418
•	ations in Silicon: Structural and Electronic Properties of Point Defect icheng Sheng, Xiaohong Shao, Wei Liu, Zhiqiang Wang	1423
Method	Composite Plate Using Finite Element and Eigenvector Orientation g Qin, Jing Li, Xuefeng Zhang	1428
Theoretical and Expe Variable-cross-section Xiaoguang Lin, Xiaoqi Ho		1433
Error Analysis of the S Kai Zhu, Lianchun Long,	Strain Experiment under Laser Irradiation through Numerical Simulation  Ming Chen	1439
Modeling and Prediction Shengrui Yu, Ligang Cad	on of Paint Film Deposition Rate for Robotic Spray Painting	1445
WA1-3 Analysis & Design o	of Robotic Systems	
approach and Hardwa	n Engineering for Vehicle System utilizing Model Driven Architecture are-in-the-Loop Simulation ong, Haibo Jia, Hongtao Pan, Philip Moore, Roy Kalawsky, John O'Brien	1451
2D	Single Object Grasped by A Multifingered Hand with Angular Joints in	1457
•	f Active Vibration Control for Flexible Beam by Using a Stewart Platform	1465

A Modular Approach to Detailed Dynamic Formulation and Control of Wheeled Mobile Robot Sambhunath Nandy, Sankar Nath Shome, Guotam Chakraborty, Cheruvu Siva Kumar	1471
Modular Design Method and Module Interface Development for Small Reconfigurable Underwater Vehicle Yujia Wang, Mingjun Zhang, Hao Su	1479
Development of a Dual-mode Mobile Robot System for Practical Applications Chaoquan Li, Fuquan Dai, Fangxing Li, Shusan Wang, Xueshan Gao, Kejie Li	1485
WA2-3 Robot Applications	
Car-like Mobile Robot Oriented Digital Acceleration Control Method  Yina Wang, Shuoyu Wang, Renpeng Tan, Yinlai Jiang	1491
Three-Dimensional Obstacle Avoidance Online Path-Planning Method for Autonomous Mobile Overhead Crane Shunsuke Nagai, Akihiro Kaneshige, Satoshi Ueki	1497
Trajectory Tracking Control of a 2-degree-of-freedom Gantry Crane Robot with Dynamic Friction Compensation  Lan Yu, Yaqing Zheng	1503
Design and Realization of a Mobile Robot for Power Transmission Lines Inspection Guangzhi Zhao, Ludan Wang, Sheng Cheng, Jianwei Zhang	1509
On the Design for AGVs: Modeling, Path Planning and Localization Qi Sun, Hui Liu, Qiang Yang, Wenjun Yan	1515
A Sound Card-based FHMA Acoustic Communication System for Multiple Underwater Robots Zixin Zhao, Shuxiang Guo	1521
WP1-3 Measurement Technology	
Operation Verification of Hybrid Temperature Recorder Monitoring System Olarn Wongwirat, Keelati Oonchom, Benjaporn Arnuttinanon	1526
Basic Characteristics Analysis of Tuning Fork Structured Piezoelectric Vibration Sensor and Application for Robot Control Takayuki Matsuno, Yasunori Shima, Tatsuo Motoyoshi, Toshio Fukuda	1532
Stair Boundary Extraction using the 2D Laser Scanner Chan-Soo Park, Eun-Ho Seo, Doik Kim, Bum-Jae You, Sang-Rok Oh	1538
Measurement and Analysis of the Welding Arc Current Density and Pressure Distribution based on Split Anode Method Shujun Chen, Fan Jiang, Zhenyang Lu, Dongbo Tao, Yang Yu	1544
Bias Voltage Correction of HMC1022 AMR Sensor Yanxia Liu, Xisheng Li, Xiuhui Wang	1550

Research on Measurement Technology of Lubricating Film State Based on Displacement Sensor of Two-Circle Coaxial Fiber Ping Zhang, Xiaodong Zhang, Chengqi Li	1555	
WP2-3 Pattern Recognition		
Ipsilateral Visual and Auditory Spatial Information Interaction Mechanisms in Selective Attention Conditions: Behavioral and ERP Study Yulin Gao, Qi Li, Jingjing Yang, Jinglong Wu	1560	
Multiple Cortical Representation Methods for Functional Localization in the Human Brain Tianyi Yan, Bin Wang, Jinglong Wu, Bing Yu, Qiyong Guo	1566	
Fault Recognition of Large Steam Turbine Based on Higher Order Spectral Features of Vibration Signals Yanbing Zhou, Yibing Liu, Hongwen An, Keguo Yan	1572	
Design of Quartz Accelerometer Signal Acquisition System Chunfeng Yue, Huadong Yu, Jinkai Xu	1578	
Pattern Recognition to Lamb Freshness Based on Much Data Merging Peiyuan Guo, Man Bao	1583	
WA1-4 Control Application II		
Using an Internal Model Control Method for a Distillation Column Alina-Simona Baiesu, Nicolae Paraschiv, Daniel Mihaescu	1588	
Air Cushion Vehicle Track-Keeping Based on AGA Auto Disturbance Rejection Control Xiaocheng Shi, Zhenye Liu, Mingyu Fu, Chenglong Wang	1594	
Design of EtherCAT Slave Module Cunfeng Kang, Yan Pang, Chunmin Ma, Chenmei Li	1600	
PCA-AR based Fault Prognosis for Turbine Machine Qiuyan Wang, Jie Ma, Xiaoli Xu	1605	
Study on the Speed Control Method for Three Axes High Speed Engraving Machine Based on Embedded System  Muye Pang, Hui Li, SongSong Li, Bo Wang	1611	
WA2-4 Control Application III		
Performance Evaluation of a Binary Control Technique for Brushless DC Motor Drives Krishan K. Sharma, A. Swarup, Bhim Singh	1617	
Quaternion-Based Orientation Estimation with Static Error Reduction Eun-Ho Seo, Chan-Soo Park, Doik Kim, Jae-Bok Song	1624	
DVL Aided Fine Alignment for Marine SINS Yueyang Ben, Zhongjun Zhu, Qian Li, Xiao Wu	1630	

Constrained Control Allocation using Cascading Generalized Inverse for Dynamic Positioning of Ships Xiaocheng Shi, Yushi Wei, JiPeng Ning, Mingyu Fu	1636
Vector Control of PWM Rectifier based on a Novel Virtual Flux Observer Peng Dai, Su Dong, Xiao Fu, Yang Li	1641
A Novel Sliding Mode Observer for PMSM Sensorless Vector Control Liang Qi, Tinggang Jia, Hongbo Shi	1646
WP1-4 Control Application IV	
A Novel Bio-Inspired Distributed Coverage Controller for Pollution Monitoring John Oyekan, Huosheng Hu, Dongbing Gu	1651
A Review: The Control Strategies of Synchronized Switching Damping Technique Xu Han, Marcus Neubauer, Jörg Wallaschek	1657
A Hybrid Particle Swarm Algorithm for Assembly Line Balancing Problem of Type 1 Jianping Dou, Jun Li, Qi Lv	1664
Research on Computer Control Strategy for Optical Electric Tracking System Miao Li, Huibin Gao	1670
Improved De-noising Approach of Fiber Optic Gyroscope Based on Lifting Scheme Wavelet Zhiyong Xie, Tao Zhang, Nong Cheng, Jingyan Song	1676
Research and Implementation on Control Technology of Plane Two-DOF Dual-Truck Parallel Mechanism Shuwen Sun, Na Wu, Gang Zheng, Xinhua Wang, Huanxiong Xia	1682
WP2-4 Vibration Control&Analysis	
Mechanical and Control Design of Caster for Low Vibrations and Crashes of Carts Kiyoshi Ioi, Takashi Kawabuchi, Atsushi Suda, Koji Moriya	1688
Research on Transfer Characteristics of Vibration of Shaft and Beam Sonic Crystals under Concentrated Mass Boundary Condition Haisheng Shu, Shaogang Liu, Weiyuan Wang, Dan Zhao, Fa Zhang, Enwu Gao	1694
Control of Flexural Vibration in a Periodic Pipe Conveying Fluid based on a Bragg Scattering Mechanism Coupled with a Locally Resonant Mechanism Huijie Shen, Jihong Wen, Dianlong Yu, Xisen Wen	1700
Fault-Tolerant Control of Dynamic Positioning Vessel by Means of a Virtual Thruster Mingyu Fu, Jipeng Ning, Yushi Wei	1706
A Shadow Elimination Algorithm for Vehicle Detection by Merging Projection Features and HSV Color Space Haijun Wu, Le Xin, Yangzhou Chen	1711

## WA1-5 Robot Navigation II

Location Dependent Variable Information Gain Approach to Multi Robot Coverage Problem Mert Turanli, Hakan Temeltas	1717	
A Study of Cluster Robots Line Formatted Navigation Using Potential Field Method Yo hwan Kang, Min cheol Lee, Chi yen Kim, Sung min Yoon, Chi beom Noh	1723	
Sparsed Potential-PCNN for Real Time Path Planning and Indoor Navigation Scheme for Mobile Robots S. U. Ahmed, U. A. Malik, K. F. Iqbal, Y. Ayaz, F. Kunwar	1729	
Research on Object Recognition Using Bag of Word Model for Mobile Robot Navigation Jinfu Yang, Kai Wang, Mingai Li, Lu Liu	1735	
Research on Real-time Route Planning for Unmanned Aircraft in Geomagnetic Matching Guidance	1741	
Yuan Sun, Jinsheng Zhang, Shicheng Wang, Wei Jiao		
Ultrasonic Transducers Frequency Response Study with Equivalent Circuit and Finite Element Method	1746	
Chunyan Gao, Dingguo Xiao, Qinxue Pan, Chunguang Xu		
WA2-5 Robot Navigation with Ranging		
A Fast and Robust Scan Matching Algorithm Based on ML-NDT and Feature Extraction Cihan Ulaş, Hakan Temeltaş	1751	
Indoor Localization Using Infrared Global Vision System and LRF for Twin Brushes Floor Polishing Robots Yoshihiro Fuse, Masaaki Furuya, Hiromi Watanabe, Tsutomu Tanzawa, Michiyoshi Nishimura, Chiak Yoshimura, Shinji Kotani, Noriaki Kiyohiro	1757	
Road Following Based Navigation in Park and Pedestrian Street by Detecting Orientation and Finding Intersection  Atsushi WATANABE, Shigeru BANDO, Kazuhiro SHINADA, Shin'ichi YUTA	1763	
Fast Plane Detection for SLAM from Noisy Range Images in Both Structured and Unstructured Environments  Junhao Xiao, Jianhua Zhang, Jianwei Zhang, Houxiang Zhang, Hans Petter Hilder	1768	
Mobile Robot 3D Map Building based on Laser Ranging and Stereovision Songmin Jia, Wei Cui, Xiuzhi Li, Hongmin Shen, Jinbo Sheng	1774	
A New Localization Method for Mobile Robots Using Genetic Simulated Annealing Monte Carlo Localization  Xiao Kang, Kejie Li, Wei Zhu	1780	
WP1-5 Teleoperation		
Biped-walking Robot Teleoperation and Remote Monitoring Featuring 3G Mobile Phone Rui Zhong, Dongying Ju	1786	

Internet Based Crossover Robot Remote Control Competition among Asian Countries C Xu, A Ming, C Kanamori, H Aoyama, H Li, L Xu, X Li, T Benjanarasuth, S Nundrakwang, B. Purahong, CC Wong	1792
A New Tele-operating Vascular Interventional Robot for Medical Applications Honghua Zhao, Xingguang Duan, Huatao Yu, Xingtao Wang	1798
Over-the-horizon Teleoperation System for Underground Unmanned LHD Yuepin Lu, Tianxu Jin, Li Liu, Chao Yang	1804
An Improvement of D* lite Algorithm for Planetary Rover Mission Planning Shaoyang Dong, Hehua Ju, Hongxia Xu	1810
Direct Adaptive Neuro Control for Teleoperation  Anan Suebsomran	1816
WP2-5 Predictive & Learning Control	
Motion Planning for a Dynamically-coupled Hyper-dynamic Manipulator by Reinforcement Learning Masahiro Wada, Aiguo Ming, Makoto Shimojo	1822
Development of a Novel Iterative Learning Control Algorithm using Empirical Mode Decomposition Technique  Meng-Shiun Tsai, Chung-Liang Yen, Hong-Tzong Yau	1828
A Neuro-Fuzzy Compensator based Smith Predictive Control for FOPLDT Process Hao Chen, Zoubir Zouaoui, Zheng Chen	1833
Twin Rotor System Modeling, De-coupling and Optimal Control Peng Wen, Yan LI	1839
Design and Simulation of a MRAC Controller for a Human-Scale Tele-Operating System Nan Xiao, Shuxiang Guo	1843
WA1-6 Sensor Design II	
Tip Force Depend on the Motor Distribution with Bi-article Arm Using Planetary Gear Atsushi Umemura, Toshimasa Haneyoshi	1849
Megahertz-range Magnetostrictive Sensor for Exciting Longitudinal Guided Waves in Steel Rods/Strands Cunfu He, Xiucheng Liu, Bin Wu, Hao Fu	1855
Study on The Compensation Technology for The Intensity Modulated Two-Circle Coaxial Fiber Optic Displacement Sensor Chengqi Li, Xiaodong Zhang, Ping Zhang	1861
Dielectric Property of Ion Beam Enhanced Deposited Lithium Tantalate Thin Film Infrared Detector  Deyin Zhang, Wei Qian, Kun Li, Jiansheng Xie	1867

Research and Realization of Real-time Wavelet Filter Algorithm for Shipborne FOG Jianhua Cheng, Mingyue Li, Wenting Rong, Li Chen	1872
The Research of an Energy Recovery Retarder with SRM Structure Bendong Liu, Weihan Zhang, Jiahui Yang	1877
WA2-6 Industrial Sensing	
On New Methodology of AMESim® & CATIA® V5- based Cavitation Simulation for Flow Rate Control of Trochoid Hydraulic Pump Myung SikKim, Won JeeChung, Chang DooJung, Su SeongPark, Hi ChunAhn, Hyung ChunKim	1882
Analyzing of Voltage-Source Selective Harmonic Elimination Inverter Wenyi Zhang, Qiang Zhang, Wensheng Chen, Liuzhong Zhang	1888
A High-Performance Adjustable-Speed System Based on Quasi Z-Source Inverter Xinping Ding, Yan Lu, Hong Li, Bo Yu, Jia Liu	1893
Voltage Sags on Quasi-Z-Source Adjustable-Speed Drives System Bo Yu, Xinping Ding, Yan Lu, Hong Li, Xia Li	1899
Dynamic Simulation and Gravity Balancing Optimization of Spot Welding Robot Based on RecurDyn Yanshen Wang, Lianzheng Ge, Pingchun Xie, Yuxian Gai	1905
Implementation of Self-rehabilitation for Upper Limb based on a Haptic Device and an Exoskeleton Device Zhibin Song, Shuxiang Guo	1911
WP1-6 Industrial Control	
Robust Sensorless Control of PMSG with MRAS in Variable Speed Wind Energy Conversion System  Hsuan-Chi Tseng, Stone Cheng	1917
Industrial Applications of Chatter Stability Prediction and Monitoring System for Turning Processes  Kaibo Lu, Minqing Jing, Yongqiang Zhang, Heng Liu	1923
Modeling and Simulation for Arrested Landing of Carrier-based Aircraft Kaidong Lv, Qidan Zhu, Xinfei Li	1928
Hardware Implement of Numerical Control System for Bearingless Induction Motor Wenshao Bu, Songcan Zhang, Shanming Wan, Shenghua Huang	1934
Error Analysis of Precision Grinding for Screw Rotors  Jing Wei, Guanghui Zhang	1939
Dynamic Analysis of 5-DOF Parallel Machine Tool with Redundant Actuation Cheng Li, Yongsheng Zhao, Hongguang Wang	1945

## WP2-6 Fault Diagnosis

	Machine Fault Severity Estimation Based on Adaptive Wavelet Nodes Selection and SVM M.F. Yaqub, I. Gondal, J. Kamruzzaman	1951
	Fast Safety Verification of Interior Parts of Automobiles Satoru Yamazaki, Takahiro Baba, Nobuyuki Umezu, Masatomo Inui	1957
	Study of Quantitative Evaluation by Using Fatigue Analysis for Assembly Work Shunichi Uno, Kazuki Kanda, Okitoshi Tsunoda	1963
	Aircraft Wiring Fault Evaluation Based on Modeling and Parameter Identification Yinni Cao, Guangjun Liu	1969
	A Testing Device for Reliability of Camera IR Cut Switching He Teng, Yunzhou Zhang, Chengdong Wu, Hao Wu	1975
	Stochastic Model Predictive Energy Management for Series Hydraulic Hybrid Vehicle Daiwei Feng, Dagui Huang, Dinggen Li	1980
WA1-	7 Signal Processing III	
	Study on a Method of Restoring the 3D Virtual Nail Model from the 2D Image Data based on the GFFD Deformation Method Satoshi Kondo, Tuoya, Katsuhiro Kitajima	1987
	Fast Tracking of Feature Points in Full-View Image  Xuebin Qin, Shigang Li	1993
	Stereo Matching with Cross-based Region, Hierarchical Belief Propagation and Occlusion Handling Chao Liang, Liang Wang, Hongyun Liu	1999
	Research on MWD Mud Pulse Signal Extraction and Recognition  Bing Tu, Desheng Li, Enhuai Lin	2004
	A New Image Restoration Algorithm Based On Window Roaming and RBF Neural Network Liwei Zhang, Yaping Zhang	2009
	A Closed-loop Design Methodology for Underwater Transducers Pulse-shaping Marco Morgado, Paulo Oliveira, Carlos Silvestre	2014
WA2-	7 Numerical Analysis	
	Optimum Inverse Kinematic Method for a 12 DOF Manipulator Ali Pyambri Paramani	2020
	Dynamic Analysis of Maglev Conveyor Using an EM-PM Hybrid Suspension Kijung Kim, Jongboo Han, Changhyun Kim, Jongmin Lee, Hyungsuk Han	2027
	A Simulation and Visualization Platform for Fractionated Spacecraft Attitude Control System Xueliang Bai, Xiaofeng Wu	2033

Modeling Longitudinal Aerodynamic and Hydrodynamic Effects of a Flying Boat in Calm Water Yinggu Zhu, Guoliang Fan, Jianqiang Yi	2039
Study on Error Sensibility of UPU Parallel Manipulator based on Probability Distribution Sheng Guo, Naiyue Wang, Yuefa Fang, Xiaoxiao Li	2045
Experimental Study on Synchronizing Spatiotemporal Chaos via Active-Passive Decomposition  Lijing Zhang, Wei Guo, Daxin Liu	2051
WP1-7 PID Control	
Design of Fractional Order Iterative Learning Control on Frequency Domain Hongsheng Li, Jiacai Huang, Di Liu, Jianhua Zhang, Fulin Teng	2056
PD Regulated Sliding Mode Control of a Quadruped Robot S. Ali A. Moosavian, Mahdi Khorram, Ali Zamani, Hamed Abedini	2061
Comparative Study of PI Controller and Fuzzy Logic Controller for Three-phase Grid-connected Inverter Chao Ma, Dagui Huang	2067
Study on Missile Rudder Servo System Based on Mixed Fuzzy-PID Control Algorithm Yingzhe Wu, Hui Li, Ye Bi, Bo Guo	2072
Simulation and Controlling for Weld Shape Process in P-GMAW Based on Fuzzy Logic Zhihong Yan, Guangjun Zhang, Lin Wun	2078
Research on UUV's Heading Control based on Adaptive Robust PD Control Principle Shijie Li, Jian Xu, Guoqing Xia, Jie Zhao	2083
WP2-7 Control of Nonsmooth Systems	
Adaptive Control for Piezo-Actuated XY-Table  Xinkai Chen, Makoto Hattori	2089
Vision-based Control of SMA-Actuated Polymer Microgripper with Force Sensing R.J Chang, C.C Shiu	2095
Flatness Based Control with Adaptive Load Torque Compensation for Position Tracking of Electro Hydraulic Actuators Wonhee Kim, Donghoon Shin, Chung Choo Chung, Daehee Won	2101
Networked Fault-Tolerant Control Strategy of Multi-Actuated Control Surface Failure Using Smart Actuators Inseok Yang, Donggil Kim, Dongik Lee	2107
Adaptive Neuro-Fuzzy Friction Compensator in Servo Hydraulic System S. Hutamarn, P. Pratumsuwan, W. Po-ngaen	2113
The Nonlinearity Compensation of Piezoresistive Sensor based on Levenberg-Marquardt Algorithm  Dacheng Xu, Zhen Lei	2118

### TP1-P Mechatronics & Automation

Improved Evaluation Method of Major Hazard Installations Hailong Zhang, Jinzhong Liu, Wei Li, Liyan Dong	2123
Hybrid Position, Posture, Force and Moment Control with Impedance Characteristics for Robot Manipulators Yu Yao, Qingjiu Huang, Yan Peng, Taishi Oiwa	2129
Aerial Fish Feeding System Muhammad Farid Shaari, Mohammad Ezri Indra Zulkefly, Md Saidin Wahab, Faizal Esa	2135
Vehicle for Automation Research and Underwater Navigation Ravindra Kumar Sinha, Sabir Ahmed, Mayank Tutwani, Puneet Bahuguna, Rohit Kumra, Vineet Agarwal, Vidush Saxena, Vinay Mittal, Prateek Gupta	2141
Fluid Dynamic Analysis of an ICPF Actuated Fish-like Underwater Microrobot with 3 DOF Baofeng Gao, Shuxiang Guo	2147
A New Cartesian Cutting Robot with Laser Height Control System Ronghuai Qi, Huihuan Qian, Tinlun Lam, Yangsheng Xu, Tao Zhang, Wei Zhu, Feng Zhang, Jianxiong Liao	2153
Focused Crawler URL Analysis Model Based on Improved Genetic Algorithm Hui Ning, Hao Wu, Zhongzheng He, Yazhou Tan	2159
The Robustness Analysis of Two Motion Control Algorithms for Stäubli TX40 Robot in Object Manipulation Task Hesam Eddin Shoori Jazeh, Farzad Cheraghpour Samavati, Masoud Vaezi, S.Ali A. Moosavian	2165
Application of MAG Index for Optimal Grasp Planning Hamed Mesgari, Farzad Cheraghpour, S. Ali A. Moosavian	2171
Modeling of a Constraint Force at RCM point in a Needle Insertion Task  Hyo-Jeong Cha, Byung-Ju Yi	2177
Error Analysis of the Attitude Updating Algorithm for Submarine in the Dynamic environment Bo Xu, Yanling Hao	2183
Stability Control of Quad-Rotor Based on Explicit Model Following with Inverse Model Feedforward Method Yue Bai, Xun Gong, ZhiCheng Hou, YanTao Tian	2189
Robust Fault Detection of Mobile Robots Using an Ellipsoid Bounding Identification Algorithm Bo Zhou, Xianzhong Dai	2195
Sliding Mode Control Based Hybrid Closed-loop Design for Stable Walking of Biped Robot with Heterogeneous Legs Fei Wang, Shiguang Wen, Chengdong Wu, Zhiyong Cheng	2201
The Design and Implementation of Volume Adaptive Control at Worksite Qi Li, Yanfei Liu, Yan Liu, Yanping Mei	2206

Study on the Effective Visual Navigation for an Alife Mobile Robot  Jiwu Wang, Masanori Sugisaka	2211
Information Fusion Multi-stage Identification Method for Multisensor Multi-channel ARMA Models Chenjian Ran, Zili Deng	2216
Application Research of Laser Interferometer to Measure Length of Gauge Blocks Lei Huang, Hong Ma, Yanhong Dou	2222
Fetal Birth Simulation Teaching System  Ziming Zhang, Wang Lu, Yuanzheng Shi, Tinglei Yang, Shuli Liang	2227
Fast Vision-based Object Segmentation for Natural Landmark Detection on Indoor Mobile Robot Xiaojie Chai, Feng Wen, Kui Yuan	2232
The Design and Implementation of Audio Analyzer Based on ARM Qi Li, Yan Liu, Yanfei Liu, Yanping Mei	2238
Autonomous Navigation for an Unmanned Mobile Robot in Urban Areas  Jisheng Zhang	2243
Mathematic Modeling and Characteristic Analysis for the Intelligent Compactor Peihui Shen	2249
Simultaneous Localization and Mapping Based on Multilevel-EKF Hongjian Wang, Jing Wang, Liping Qu, Zhenye Liu	2254
Design and Realization of Acceleration Sensor Static Error Detection System Xiaoming Chang, Lifen Chen, Hengxi Wei, Jinjun Duan	2259
Automated Inspection Planning of Freeform Surfaces for Manufacturing Applications  Awei Zhou, Junjie Guo, Wei Shao	2264
Crack Propagation in Matrix with Inclusions by BEM Yifeng Huang, Jun Lei, Qingsheng Yang	2270
Study on Semi-Active Suspension System of Tracked Vehicle Based on Variable Universe Fuzzy Control Lingjie Kong, Xinjun Zhao, Baili Qi	2276
Measurement of Piezoresistance Coefficient with Different Gate Voltages of GaN HEMT Micro-accelerometer  Qianqian Zhang, Ting Liang, Jianjun Tang, Jun Liu, Jijun Xiong, Yong Wang	2281
Application of Particle Filtering Technique for Sensor Fusion in Mobile Robotics Jain Shikha, S. Nandy, R. Ray, S.N. Shome	2285
Mechanism Design of a Medical Manipulator for Vascular Interventional Surgery Guodong Liang, Yan Xu	2291
Automatic Assembly Control System of Bar-type Engine Oil Cooler Yuling Zhan, Xinglong Zhu, Longqin Gao, Hao Ren	2297

Development of Small Humanoid Robot BJHR-I Chengkun Wang, Jiandong Zhao, Gengxiao Wang, Boqiang Zhao, Zhonghua Wang	2303
Research on the Tele-Operation Robot System with Tele-Presence Biqiang Yao, Guang Wen	2308
Application of a New Adaptive Kalman Filtering Algorithm in Initial Alignment of INS Feng Sun, Hongqi Zhang	2312
Directivity Analysis of Transducer Array of Acoustic Directional Dispersing Device Tianwen Yang, Dagui Huang, Yun Wang, Min Chen	2317
Application of Kalman Filter Algorithm in Gravity-aided Navigation System Fanming Liu, Yan Li, Yingfa Zhang, Huijuan Hou	2322
In-situ Measuring Material Parameters of a MEMS Thinfilm with a Center-anchored Circular Plate by Non-contact Method Han Chen, Hua Rong	2327
Image Match Algorithm through Correlation Coefficient Computation in Micro Stereovision Yuezong Wang, Caizhi Yang, Shujuan Yin, Wenjia Yin	2333
Research on Credible Start-up and I/O Access Control of Embedded Linux Based on Trusted Computing  Jin Guo, Bo Li	2338
Research on Linear Ultrasonic Motor Using Longitudinal and Bending Mode Zhijian Wan, Hong Hu	2343
Research on Intelligent Acoustic Feedback Exploration and Suppression System Ziteng Huang, Dagui Huang, Ding Yang	2348
An FPGA-based VME Slave Module for Industrial Control System Hongchi Liu, Xiaoxin Wang, Shutian Zhang	2353
Dynamic Neuro-fuzzy Control Design for Civil Aviation Aircraft in Intelligent Landing System Kaijun Xu, Guangming Zhang	2359
Output Feedback Control for Dynamic Positioning Vessels Using Nonlinear Observer Backstepping Xiaocheng Shi, Wenbo Xie, Mingyu Fu	2364
The Application Study of Heave Compensation Control Based on Motion Prediction and Fuzzy-PID for Intelligence Crane Lin Feng, Xinfu Zhang, Xingquan Zhai, Haibo Huang	2370
The Computational Design of a Water Jet Propulsion Spherical Underwater Vehicle Shuxiang Guo, Juan Du, Xiufen Ye, Rui Yan, Hongtao Gao	2375
Stable Adaptive Control of Nonlinear Dynamical Systems Lin Niu, Junsheng Li, Jingye Lei	2380
Design and Realization of Fluxgate Sensor Signal Processing Unit Wei Gao, Guochen Wang, Qichao Zhao	2386

Improved Particle Filter Algorithm for INS/GPS Integrated Navigation System Feng Sun, Lijun Tang	2392
Optimal Control in Variable-speed Pumping Stations Fulai Yao, Hexu Sun	2397
An Algorithm of Moving Objects Detection for Indoor Environment Based on Laser and Vision Liying Su, Shucai Wang, Yueqing Yu	2402
Development of the Remote Monitoring and Warning System for Operation Condition of the Main Drainage Pump in Mine Sheng Fu, Yabin Zhang, Haiqiang Song	2408
Statistical Analysis of Steam Turbine Faults Yufeng Ma, Yibing Liu, Hongwen An	2413
Based on AHP Comprehensive Evaluation of Optical Strapdown Inertial Navigation System Yanling Hao, Hongwei Mu	2418
An Anomaly Recognition Algorithm for DVL Yanling Hao, Yi Zhang, Feng Sun	2423
Research on Stability for Linear Control System with Time Delay Changhui Song, Wei Ji, Xi Gong, Zhigang Hu	2428
The Control System Research of Paving Machine for the Modified Asphalt Coiled Material Weihan Zhang, Bendong Liu, Desheng Li, Jiahui Yang	2433
Simulation and Analysis of Ship Electrical Propulsion System in Waves Shijia Lv, Yaohua Luo, Jiang You, Shaobo Kang	2438
Study on Magnetic Coupling FBG Displacement Sensor Haokun Mi, Qiuming Nan	2443
A Model and Optimization Method Used for Vehicles Velocity Calculation of Non-central Crash Accident Yangshan Tang, Liying Wang	2448
Research on Positioning Operation Control Method of J-lay Vessel Dongyan Zhao, Xinqian Bian, Cuihe Chen, Mingyu Fu, Wenbo Xie, Lianbo Cai	2454
PID Controller Tuning using Multi-Objective Optimization based on Fused Genetic-Immune Algorithm and Immune Feedback Mechanism  Maryam Khoie, Ali Khaki Sedigh, Karim Salahshoor	2459