

14th International Symposium on Measurement and Control in Robotics 2004

**Houston, Texas, USA
16 – 18 September 2004**

ISBN: 978-1-61567-394-0

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2004) by the International Measurement Federation (IMEKO)
All rights reserved.

Printed by Curran Associates, Inc. (2009)

For permission requests, please contact the International Measurement Federation (IMEKO)
at the address below.

IMEKO-International Measurement Federation Secretariat
P.O. Box 457
H-1371 Budapest
Hungary

Phone/Fax: +36 1 353 1562

imeko@t-online.hu

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

SESSION A-1. HUMANOID ROBOTS AND MODEL

Real World Video Avatar: Transmission and Presentation of Human Figure	1
<i>H. Maeda, T. Tanikawa, J. Yamashita, K. Hirota, M. Hirose</i>	
A Method to Solve Inverse Kinematics of Redundant Slave Arm in The Master-Slave System with Different Degrees of Freedom	9
<i>S. Nakagawara, R. Tadakuma, H. Kajimoto, N. Kawakami, S. Tachi</i>	

SESSION A-2. CLIMBING AND WALKING ROBOTS

Adaptive Neuro-Fuzzy Control of AMRU5, a Walking Robot with 6 Pantograph-Based Legs	13
<i>J. C. Habumuremyi, P. Kool, Y. Baudoin</i>	
Climbing and Walking Robots: New Trends and Commercial Markets	21
<i>Y. Baudoin et al</i>	

SESSION B-1. AUTONOMOUS MOBILE ROBOTS

Intelligent Mobile Robots Supporting Security and Defense	26
<i>A. Maslowski</i>	
Adaptive Fuzzy Path Planning for Navigation of Mobile Robots	37
<i>T. T. Pham</i>	

SESSION B-2. ADVANCED CONTROL 1

Exercise Machine Controller Design	43
<i>S. Motamarri, H. A. Malki, E. Barbieri, E. J. Charlson</i>	
Generalized Gaussian Densities, Multivariate Distributions and Moments for Kalman Filter Design	50
<i>S. Fotedar, G. Chen, R. J. P. deFigueiredo, T. T. Pham</i>	

SESSION C-1. ADVANCED ROBOTICS

Control Strategies for Innovative Eye-in-hand Robotic Applications	54
<i>J. Uusitalo, T. Sandelin, R. Tuokko</i>	
Input Saturated Systems: A Digital Redesign Approach to Controller Synthesis for a Class of Nonlinear Systems	62
<i>A. C. Dunn, L. S. Shieh, J. S. H. Tsai</i>	

SESSION C-2. ADVANCED CONTROL 2

Modeling and Friction Compensation for a Dual Stage Positioning System	73
<i>S. Thimmalapura, S. C. Smith, R. Langari</i>	
A Neural Network-Based Approach for Control of Vibration in a Black Hawk Helicopter	83
<i>J. I. Canelon, H. A. Malki, L. S. Shieh</i>	

SESSION D-1. ROBOTIC HARDWARE/DESIGN STANDARD

A Unified Approach to Design and Implement Robotics Standards	90
<i>Z. Taqvi, T. T. Pham</i>	
Smart Measurements Based on Virtual Standards® Technology	98
<i>S. M. Ermishin, A. V. Lopatin, V. A. Dulev, N. A. Khoteev, P. G. Shabanov</i>	

SESSION D-2. TELEPRESENCE/VIRTUAL REALITY

Development of Multi-D.O.F. Master-Slave Arm with Bilateral Impedance Control for Telexistence	115
<i>R. Tadakuma, K. Sogen, H. Kajimoto, N. Kawakami, S. Tachi</i>	
“Niwa” Where the Particle Responses – The Exhibition of Real-Virtual Interaction Through Zen Rock Garden	120
<i>R. Ueoka, T. Hirose, S. Matsushima, S. Eitoku, J. Urata, K. Hirota, M. Hirose, K. Kuma</i>	

SESSION E-1. INNOVATIVE ROBOTIC APPLICATION 1

Innovative Robotic Applications	126
<i>Y. F. Basrawi</i>	
Timber Barking Robot Design - Control Problems	133
<i>J. Volf, J. Vlcek</i>	

SESSION E-2. INNOVATIVE ROBOTIC APPLICATION 2

Computer Simulation of Robotics in the Human Space Program	137
<i>P. J. Nguyen</i>	

SESSION F-1. SENSOR INTEGRATION/FUSION

Pattern Recognition of Rotating Tactile Images by Discriminatory Analysis	145
<i>J. Volf, O. Smucr</i>	
Superconducting Organic and CNT FETs as a Biochemical Transducer	149
<i>R. Sklyar</i>	

SESSION F-2. SOFTWARE DEVELOPMENT METHODOLOGY

Automated Framework with Time Sliced Digital Signage Network	162
<i>P. Amalaman, I. N. Le</i>	
Rapid Development Software Methodology for AI Implementation	167
<i>P. Amalaman, N. Luzan, T. T. Pham</i>	

SESSION G-1. FUNDAMENTALS FOR ROBOTICS

Fault Analysis in Intelligent Robotics	173
<i>A. Vitko, M. Šavel, M. L. Jurišica</i>	
Immunity Based Systems for Faulty Sensor Detection	175
<i>P. Negi, R. Langari</i>	
Fundamentals For Robotics	185
<i>Y. F. Basrawi</i>	

SESSION G-2. INNOVATIVE ROBOTIC APPLICATIONS 3

Uncertainty Management and Evidence Weighing in On-line Diagnostics	191
<i>R. J. Cordingley</i>	
Telexistence: Fusing Virtual Reality, Robotics and Networks Together	198
<i>S. Tachi</i>	
Mobile Robotics Systems for Humanitarian Demining	205
<i>Y. Baudoin</i>	
Product Lines and Automated Assembly of Robot Controller Software	213
<i>E. Jung, C. Kapoor</i>	

Author Index