

Table of Contents

Preface, Committees, Sponsors and Organizers

Chapter 1: Methodologies for Design of Intelligent Technical Systems

Affect in Robots for Interaction and Control - Challenges for the Engineer M. Witkowski	3
Comparison of Feed Drives with a Process Oriented Design Methodology M. Rehm, J. QUELLMALZ, H. Schlegel and R. Neugebauer	11
Intelligent Robot Systems for Manipulation of Non-Rigid Objects N.A. Aspragathos	20

Chapter 2: Mobile Robots

Comparison of Suspension Systems and Chassis of Selected Mars Rovers Analogs with a Focus on Introduced Improvement M. Ostaszewski and K. Dzierżek	33
Control of Mobile Robots with Bounded Inputs in a Rigid Formation A. Ailon	38
Differential Control of Six-Wheeled Robot Using a Mobile Application A.S. Milewski, Ł. Mierzejewski and J. Tołstoj-Sienkiewicz	45
Mobile Minirobot with Hybrid Locomotion M.O. Tătar and C. Cirebea	51
Versatile Soil Sampling System Capable of Collecting, Transporting, Storing and Preliminary Onboard Analysis for Mars Rover Analogue M. Rećko, J. Tołstoj-Sienkiewicz and P. Turycz	59

Chapter 3: Designing of Mechatronic Systems

An Experimental Platform for Surface Embedded SMAs in Morphing Applications G. Jodin, J. Scheller, E. Duhayon, J.F. Rouchon, M. TRIANTAFYLLOU and M. Braza	69
Development of an Image Sensor for Dentistry - Fiber Connecting Technique with the Gradient Index (GRIN) Rod Lens M. Fujimoto, S. Yoshii, S. Ikezawa, T. Ueda and C. Kitamura	77
Implementation of a Hybrid Electro-Active Actuated Morphing Wing in Wind Tunnel G. Jodin, J. Scheller, E. Duhayon, J.F. Rouchon and M. Braza	85
Fault Detection and Fault-Tolerant Control when Using SMA Actuators in Soft Robotics T.S. Le, H. Schlegel, W.G. Drossel and A. Hirsch	92
Implementation of Different Gas Influence for Operation of Modified Atomic Force Microscope Sensor V. Bučinskas, A. Dzedzickis, E. ŠUTINYS and T. Lenkutis	99
FPGA Support in Hybrid Simulation Using Finite Element Method W. Mucha and W. Kuś	105
Measurement and Control System for Analysis of the Operation of the Stepper Motor R. Pawliczek and P. Soppa	113
Negative Resistance in Discrete Mechatronic Systems A. Buchacz and D. Gałęziowski	127
Model of Energetic Efficient Redundant Actuation K. Šubrt, P. Houška and R. Knoflíček	132
The New Cash Register Design with Counterfeit Money Detection System İ. Gücüyener and G. Erdal	140

Chapter 4: Control in Mechatronic Systems

Comparison of Different Models of Positive Fractional Continuous-Time Linear Systems and Electrical Circuits Based on the Step Responses

K. Borawski 147

On Stabilization of Non-Uniformly Sampled Control Systems - A Survey

J. Janczak and E. Pawluszewicz 156

Review of Chosen Control Algorithms Used for Small UAV Control

B. Dolega, G. Kopecki, D. Kordos and T. Rogalski 175

Chapter 5: Issues of Ensuring the Structural Reliability and Lifetime of the Mechatronic Systems

Influence of Electrode Layers on the Fracture Strength of PZT Ceramics

M. Schmidt, A. Sewohl and V. Wittstock 187

New Methodology for the Life Time Prediction of Wear Parts in the Mechatronic Systems

O. Linins, I. Boiko, J. Lungevics and A. Leitans 194

Theoretical Approach of Wear for Slide-Friction Pairs

G. Springis, J. Rudzitis, E. Gerins and N. Bulaha 202

Experimental Study of Welded Joints of Aluminium Alloy AW6082

S. Baskutis, J. Baskutiene and E. Bernotaitis 212

The Effect of the Cutting Parameters on the Machined Surface Roughness

V. Gutakovskis, E. Gerins, J. Rudzitis and A. Kromanis 219

Measurement Accuracy Problems of the Surface Texture Parameters

N. Bulaha, J. Lungevics and J. Rudzitis 227

Predictive Models for Transient Loads of Vertical Stabilizer of an Aircraft Using Canonical Correlation Analysis

M. Dziendzikowski, W. Zielinski and A. Leski 235

An Endurance Test of Composite Panels

A. Wróbel, M. Płaczek and A. Buchacz 241

Identification of Parametric and Momentary Damages on the Basis of Lindeberg-Levy's Model

P. Lindstedt and T. Sudakowski 249

Operation-Related Failures of Aircraft Turbine Engines

A. Szczepankowski and J. Szymczak 258

Analysis of Thermal Damage in the High-Speed Foil Bearing

G. Zywica, P. Bagiński and A. Andrearczyk 266

Electromagnetic Vibrations of Hydropower Generator Stator Core and Transformer Core at 100 Hz Frequency

M. Cerpinska, R. Vitols and O. Simanis 278

Employment of Two New Methods for the Research of Interaction of Wheel with a Flat and Rail

M. Bogdevicius, R. Zygiene and R. Subacius 289