

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

Friday, 18 February 2022

09:15-09:45	<p><i>Plenary meetings</i></p> <p>AMC 2022 Opening Session Chairs: Roberto Oboe</p>
10:00-12:00	<p><i>Room 1</i></p> <p>TT - Actuators and sensors in motion control Chairs: Prof. Sehoon Oh, Prof. Seiichiro Katsura</p> <p>Zonotopic Kalman Observer-based Sensor Fault Estimation for Discrete-Time Takagi-Sugeno Fuzzy Systems <i>Weijie Ren, Satoshi Komada, Yubai Kazuhiro, Daisuke Yashiro</i></p> <p>Design and Characterization of a Fully Integrated Continuum Robot Actuated by Shape Memory Alloy Wires <i>Michele Arcangelo Mandolino, Yannik Goergen, Paul Motzki, Gianluca Rizzello</i></p> <p>Performance Evaluation of a Gain-scheduled Propeller Thrust Controller Using Wind Velocity and Rotor Angular Velocity Under Fluctuating Wind <i>Yuki Kato</i></p> <p>An Approach of Load-Side Disturbance Rejection Control for Series Elastic Actuators <i>Atsushi Hiraoka, Toshiyuki Murakami</i></p> <p>Preliminary Analysis for Two-Degree-of-Freedom Magnetic Geared Screw Motor with High Torque Density <i>Yoshiyuki Hatta, Kazuaki Ito, Yasutaka Fujimoto</i></p> <p>Experimental Verification of a Novel Continuously Variable Transmission with Electro-Hydrostatic Actuator <i>Hiroshi Asai, Kei Sugihara, Tomoya Kitamura, Yuki Saito, Kouhei Ohnishi, Takahiro Nozaki</i></p>
10:00-12:20	<p><i>Room 2</i></p> <p>SS - Advanced Motion Control Techniques for Precision Mechatronic Systems - 1 Chairs: Prof. Hiroshi Fujimoto, Prof. Mitsuo Hirata</p> <p>Track-Following Control Using Resonant Filter for Dual-Stage-Actuator System in Hard Disk Drives <i>Takenori Atsumi, Shota Yabui</i></p> <p>Design Strategy of Head Positioning Control System of HDD based on Amplitude Spectrum <i>Shota Yabui, Takenori Atsumi</i></p> <p>Gaussian Process and Disturbance Observer Based Control for Disturbance Rejection <i>Hanul Jung, Sehoon Oh</i></p> <p>Frequency Response Data-based Multiple Peak Filter Design Applied to High-Precision Stage in Translation and Pitching <i>Masahiro Mae, Wataru Ohnishi, Hiroshi Fujimoto, Koichi Sakata</i></p> <p>A study on reducing effect of temporal quantization error in pulse drive systems <i>Masayasu Suzuki, Mitsuo Hirata</i></p> <p>Evaluation of Temperature Dependency for Displacement Estimation in Piezoelectric Stack Actuators <i>Chihiro Mikuriya, Kenta Seki, Makoto Iwasaki</i></p> <p>High Precision Machining Force Control of VCM-driven Deburring Equipment <i>Kazuaki Ito, Yoshiyuki Hatta, Takayoshi Yamada, Junya Sato, Yoshitaka Shiroyama, Tatsuya Hamajima</i></p>
12:00-12:20	<p><i>Room 1</i></p> <p>SS - Advanced control of underactuated and flexible robotic systems Chairs: Prof. Sehoon Oh, Prof. Seiichiro Katsura</p> <p>Input shaping for non-zero initial conditions and arbitrary input</p>

Friday, 18 February 2022

	<p>signals with an application to overhead crane control <i>Arne Wahrburg, Janne Jurvanen, Matias Niemelä, Mikael Holmberg</i></p>
12:30-13:30	<p>Plenary meetings</p> <p>Plenary 1 - Presenter: Prof. Xiaobo Tan - Talk title: Modeling and control of hysteresis in smart material actuators with minimal representations</p> <p>Abstract:</p> <p>Hysteresis remains a key nonlinearity in magnetic and smart material actuators that challenges their control performance. High-fidelity modeling and effective compensation of hysteresis, yet with low computational complexity, are of immense interest. In this talk I will share some advances in this direction via several examples. First, I will present the optimal reduction problem for a Prandtl-Ishlinskii (PI) operator, one of the most popular hysteresis models, where an optimal approximation of the original operator with fewer constituent elements (play operators) is obtained via efficient dynamic programming. Second, I will discuss adaptive estimation of play radii, instead of their weights, as an alternative means for accurate modeling of hysteresis with a PI operator of low complexity. Finally, I will report a dynamic inversion approach to hysteresis compensation that requires minimal, qualitative conditions on the hysteresis operator. Throughout the talk I will use experimental results from vanadium dioxide actuators and piezo actuators to illustrate the methods.</p> <p>Biography:</p> <p>Dr. Xiaobo Tan is an MSU Foundation Professor and the Richard M. Hong Endowed Chair in Electrical and Computer Engineering at Michigan State University (MSU). He received his Bachelor's and Master's degrees in automatic control from Tsinghua University, Beijing, China, in 1995, 1998, respectively, and his Ph.D. in electrical and computer engineering (ECE) from the University of Maryland in 2002. His research interests include smart materials, control systems, underwater robotics, and soft robotics. He has published over 300 papers and been awarded four US patents in these areas. Dr. Tan is a Fellow of IEEE and ASME. He is a recipient of the NSF CAREER Award (2006), MSU Teacher-Scholar Award (2010), MSU College of Engineering Withrow Distinguished Scholar Award (2018), Distinguished Alumni Award from the ECE Department at University of Maryland (2018), and multiple best paper awards. He is currently a Senior Editor for IEEE/ASME Transactions on Mechatronics (TMECH). He has been active in organizing international conferences, including serving as the General Chair for the 2018 ASME Dynamic Systems and Control Conference and for the 2023 American Control Conference. Dr. Tan is keen to integrate his research with educational and outreach activities, and has served as Director of an NSF-funded Research Experiences for Teachers (RET) Site program at MSU from 2009 - 2016 and Curator of a robotic fish exhibit at MSU Museum in 2016-2017.</p> <p>Chairs: Prof. Michael Ruderman</p>
13:45-14:15	<p>Room 1</p>

Friday, 18 February 2022

	Virtual Coffee Break <i>Plenary meetings</i> Virtual Coffee Break <i>Room 2</i> Virtual Coffee Break
14:30-15:10	<i>Room 1</i> TT - Visual servo systems in motion control Chairs: Prof. Wen-Hua Chen, Prof. Naoki Motoi Object Detection in Motion Reproduction System with Segmentation Algorithm <i>Xiaobai Sun, Takahiro Nozaki, Kouhei Ohnishi, Toshiyuki Murakami</i> Probabilistic Camera-to-Kinematic Model Calibration for Long-Reach Robotic Manipulators in Unknown Environments <i>Petri Mäkinen, Pauli Mustalahti, Sirpa Launis, Jouni Mattila</i>
14:30-15:50	<i>Room 2</i> TT - Advanced motion control in mechatronics and robotics - 1 Chairs: Prof. Marina Indri, Prof. Paolo Boscarol Imperfect Dynamic Modeling of Parallel Robots Eases the Crossing of Type-II Singularities <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 <i>Dries Dirckx</i> Improving the robustness in motion planning of flexible systems through structural modification: a case study <i>Paolo Boscarol, Dario Richiede, Jacopo Tamellin, Alberto Trevisani</i> Model-Free Detection of Penetration and Automatic Stop Control in Dental Implant Surgery Based on Differential Value of Torque <i>Yusuke Kido, Hiromasa Kawana, Seiji Asoda, Takahiro Nozaki, Toshiyuki Murakami</i>
15:10-16:30	<i>Room 1</i> TT - Intelligent and adaptive motion control systems Chairs: Prof. Wen-Hua Chen, Prof. Naoki Motoi Path optimization for autonomous sediment scooping operations <i>Yutaka Uchimura, Naotoshi Higuchi</i> Motion Generation Based on Physical Property Estimation in Motion Copy System <i>Tomoya Kitamura, Xiaobai Sun, Yuki Saito, Hiroshi Asai, Takahiro Nozaki, Kouhei Ohnishi</i> ECOset-ILC: an Iterative Learning Control Approach with Set-membership Uncertainty <i>Daniele Ronzani, Joris Gillis, Goele Pipeleers, Jan Swevers</i> Optimized Exponential Square Root Unscented Kalman Filter for State Estimation of Hydraulic Systems <i>Reza Mohammadi Asl, Jouni Mattila</i>
15:50-16:30	<i>Room 2</i> TT - Micro- and nano-mechatronic systems and control Chairs: Prof. Riccardo Antonello, Prof. Kazuaki Ito

Friday, 18 February 2022

Modeling of a Clamping-based Piezo Actuator in Triangular Configuration *Stefan Krebs*
Dynamic Model of a Piezoelectric Walking Drive *Andreas Zuercher, Timon Raiser, Sören Hohmann*

Saturday, 19 February 2022

08:45-09:45

Pleanary meetings

Meeting 1 - Virtual Breakfast

Chairs: Prof. Francesco Biral

10:00-11:20

Room 1

SS - Data Robotics and Internet of Production

Chairs: Prof. Daisuke Yashiro, Prof. Yuki Yokokura

Motion-Copying System with Compensation of Environmental Changes for Calligraphy Robot *Seiichiro Katsura, Ryotaro Kobayashi*
Analysis and Comparison of Back-Forward Drivability Control Using Load-side Sensors for Human-Robot Interaction *Yusuke Kawai, Juan Padron, Yuki Yokokura, Kiyoshi Ohishi, Toshimasa Miyazaki*
Modeling of a Linear Variable Structured Elastic Actuator Considering Modal Transition of Electromagnetic Clutch *Masaki Takeuchi, Seiichiro Katsura*
Force-based Two-channel Bilateral Control for Position/Velocity Controlled Robots *Yuki Nagatsu, Hideki Hashimoto*

Room 2

TT - Force control, haptics and HMI

Chairs: Prof. Toshiaki Tsuji, Prof. Toshiyuki Murakami

Performance Evaluation of Force Control and Reaction Force Estimation in Force Sensorless Hybrid Control for Workspace Based Controller *Keita Shimamoto, Toshiyuki Murakami*
Design of Feedforward Controller Using Airframe's Velocity for Contact Force Control of Propeller Driven System *Masaya Inukai, Daisuke Yashiro, Kazuhiro Yubai, Satoshi Komada*
A Decoupling Scheme for Force Control in Cooperative Multi-Robot Manipulation Tasks *Francesco Biral, Luca De Pascali, Luca Zaccarian, Sebastian Erhart, Sandra Hirche*
Performance Improvement of Bilateral Teleoperation with Hydraulic Actuator by Friction Compensation *Yuki Saito, Hiroshi Asai, Tomoya Kitamura, Wataru Iida, Takahiro Nozaki, Kouhei Ohnishi*

11:20-11:40

Room 2

PRESENTATION JOURNAL PAPER

Paper 1

Title: A Reduced-order Multi-sensor-based Force Observer

by: Kangwagye Samuel - DGIST, Roberto Oboe - University of Padova, and Sehoon Oh - DGIST

Abstract: This paper proposes a reduced-order multi-sensor based force observer (RMFOB) for accurately estimating the force exerted on a load. The RMFOB excels in high frequency noise attenuation and low frequency time-varying measurement offsets compensation by using the combination of

Saturday, 19 February 2022

	<p>force sensor measurements, motor encoder measurements, and motor input signals, properly fused in a Kalman Filter setting, in which the dynamics of the sensors and the system is taken into account. As part of the observer design, an estimator for the force measurement offsets is also derived, so that they can be visualized and quantified. Moreover, novel tools for analyzing the KF based observer are introduced. Simulations and experiment results show that the observer can produce accurate force estimate, by compensating for the time-varying measurement offsets and attenuating the high frequency noises. Chairs: Prof. Toshiaki Tsuji, Prof. Toshiyuki Murakami</p>
11:20-12:00	<p>Room 1</p> <p>PRESENTATION JOURNAL PAPER</p> <p>Paper 1 Title: Periodic/Aperiodic Motion Control Using Periodic/Aperiodic Separation Filter</p> <p>by: Hisayoshi Muramatsu, Hiroshima University, and Seiichiro Katsura, Keio University</p> <p>Abstract: Motion control is a fundamental technique used in automated mechanical systems. Classically, velocity, force, and impedance are controlled in motion control systems, but simultaneous control is difficult. This article proposes periodic/aperiodic (P/A) motion control based on periodicity and aperiodicity of motion. The P/A motion control separately applies different control methods to P/A motions using P/A velocity and P/A force, which are extracted using a periodic/aperiodic separation filter (PASF) from velocity and force. Accordingly, six types of P/A motion controls are constructed in this article, which correspond to different combinations of the P/A velocity, P/A force, and P/A impedance controls.</p> <p>Paper 2 Title: Hierarchical Abstraction of Compensator for Reaction Torque Observer Based on Element Description Method</p> <p>by Issei Takeuchi, Tokyo Automatic Machinery Works, and Seiichiro Katsura, Keio University</p> <p>Abstract: The expansion of the applicable range of robots and machines requires the ability to cooperate with humans and adapt to external environments. It is necessary to use torque information in order to achieve these capabilities. A reaction torque observer is one of the effective methods to obtain torque information because it does not need a torque sensor and it can deal with torque information in the high-frequency domain. However, it needs a correct compensator to reject disturbances to estimate the precise torque. Generally, the disturbance compensator of the reaction torque observer is derived by manual model selection and manual/automatic parameter fitting. This method not only takes time and effort but also does not always obtain an optimal solution because it depends on a predetermined model. To overcome this issue, an automatic design method of a disturbance compensator is proposed in this article. Chairs: Prof. Daisuke Yashiro, Prof. Yuki Yokokura</p>

Saturday, 19 February 2022

11:40-12:20

[Room 2](#)

SS - Advanced Motion Control Techniques for Precision Mechatronic Systems - 2

Chairs: Prof. Takenori Atsumi, Prof. Shota Yabui

Peak Amplitude-Constrained Experiment Design for FRF Identification of MIMO Motion Systems *Nic Dirckx, Marcel Bosselaar, Tom Oomen*

A corner smoothing approach for CNC machines based on \$

\$\eta^{\{3D\}}\$-splines *Andrea Tagliavini, Corrado Guarino Lo Blanco*

12:30-13:30

[Plenary meetings](#)

Plenary 2 - Presenter: Prof. Luca Zaccarian - Talk title: To stick or to slip: Lyapunov-based reset PID for positioning systems with Coulomb and Stribeck friction

Abstract:

Reset control systems for continuous-time plants were introduced in the 1950s by J.C. Clegg, then extended by Horowitz twenty years later and revisited using hybrid Lyapunov theory a few decades ago, to rigorously deal with the continuous-discrete interplay stemming from the reset laws. In this talk, we overview a recent research activity where suitable reset actions induce stability and performance of PID-controlled positioning systems suffering from nonlinear frictional effects.

With the Coulomb-only effect, PID feedback produces a nontrivial set of equilibria whose asymptotic (but not exponential) stability can be certified by using a discontinuous Lyapunov-like function. With velocity weakening effects (the so-called Stribeck friction), the set of equilibria becomes unstable with PID feedback and the so-called "hunting phenomenon" (persistent oscillations) is experienced. Resetting laws can be used in both scenarios. With Coulomb friction only, the discontinuous Lyapunov-like function immediately suggests a reset action providing extreme performance improvement, preserving stability and increasing the convergence speed. With Stribeck, a more sophisticated set of logic-based reset rules recovers the global asymptotic stability of the set of equilibria, providing an effective solution to the hunting instability.

We will discuss the Lyapunov-based proofs of these hybrid laws, requiring nontrivial derivations, such as building semi-global hybrid simulation models. The theoretical results will be illustrated by experiments carried out on an industrial nano-positioning system, showing the experimental advantages arising from our novel reset PID controllers.

Biography:

Luca Zaccarian received the Laurea and the Ph.D. degrees from the University of Roma Tor Vergata (Italy) in 1995 and 2000, respectively. He has been Assistant Professor in control engineering at the University of Roma, Tor

Saturday, 19 February 2022

	<p>Vergata (Italy), from 2000 to 2006 and then Associate Professor. Since 2011 he is Directeur de Recherche at the LAAS-CNRS, Toulouse (France) and since 2013 he holds a part-time position at the University of Trento, Italy. Luca Zaccarian's main research interests include analysis and design of nonlinear and hybrid control systems, modeling and control of mechatronic systems. He has served in the organizing committee and TPC of several IEEE and IFAC conferences. He has been a member of the IEEE-CSS Conference Editorial Board and an associate editor for Systems and Control Letters and IEEE Transactions on Automatic Control. He is currently a member of the EUCA-CEB and an associate editor for the IFAC journal Automatica and for the European Journal of Control. He was a nominated member of the Board of Governors of the IEEE-CSS in 2014, and an elected member in 2017-2019. He was Student Activities Chair for the IEEE-CSS in 2015-2017 and is currently Associate Editor of Electronic Publications (Conference Information) for the IEEE-CSS. He was a recipient of the 2001 O. Hugo Schuck Best Paper Award given by the American Automatic Control Council. He is a fellow of the IEEE, class of 2016.</p> <p>Chairs: Prof. Francesco Biral</p>
13:45-14:15	<p>Room 1 Virtual Coffee Break</p> <hr/> <p>Pleanary meetings Virtual Coffee Break</p> <hr/> <p>Room 2 Virtual Coffee Break</p>
14:30-16:50	<p>Room 1 TT - Advanced motion control in mechatronics and robotics - 2 Chairs: Prof. Jan Swevers, Prof. Arne Wahrburg Localization of pallets on shelves in a warehouse using a wide-angle camera <i>NOBUYUKI KITA</i> Negative Quadrant Glitch Suppression of Ball-screw-driven Stage by Initial Value Compensation with Additional Input <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 <i>Alejandro Astudillo Vigoya, Joris Gillis, Goele Pipeleers, Wilm Decré, Jan Swevers</i> Shooting methods for identification of nonlinear state-space grey-box models <i>András Retzler, Jan Swevers, Joris Gillis, Zsolt Kollár</i> Motion Control for Aerial and Ground Vehicle Autonomous Platooning <i>Emanuele Venzano, Hugo Pousseur, Alessandro Correa Victorino, Pedro Castillo Garcia</i> Motion Control Auto-Tuning in Elevator <i>Janne Salomaki</i> Improvement and Analysis of Position and Speed Estimator in Low Speed Range for IPMSM Based on Disturbance Observer <i>Ryosuke Nakatsuka, Takahiro Nozaki</i></p> <hr/> <p>Room 2 SS - Advanced Motion Control Techniques for</p>

Saturday, 19 February 2022

Precision Mechatronic Systems - 3

Chairs: Prof. Michael Ruderman, Dr. Max van Haren

Gaussian Process Position-Dependent Feedforward: With Application to a Wire Bonder *Max van Haren, Tom Oomen, Maurice Poot, Jim Portegies, Dragan Kostic, Robin van Es*

A Gaussian Process Approach to Multiple Internal Models in Repetitive Control *Noud Mooren, Tom Oomen, Gert Witvoet*

Control of an Overactuated Nanopositioning System with Hysteresis by Means of Control Allocation *Renzo Seminario, Christian Schmitt, Christoph Weise, Johann Reger*

Analysis of Power Amplifier Contribution to the Precision of Motion Systems *Marziyeh Hajiheidari, Duo Xu, Jeroen van Duivenbode, Bas Vermulst, Mircea Lazar*

Generalization of ILC for fixed order reference trajectories using interpolation *Max Bolderman, Mircea Lazar, Gerben Erens, Hans Butler*
Systematic feedback control design for scattered light noise mitigation in Virgo's MultiSAS *Mathyn van Dael, Tom Oomen, Gert Witvoet, Bas Swinkels*

Robust Continuous Finite-Time Tracking Control with Finite-Time Observer for a Stewart Platform *Nithin Xavier, Bijan Bandyopadhyay, Johann Reger, Lars Watermann*

Sunday, 20 February 2022

08:45-09:45

Plenary meetings

Meeting 2 - Virtual Breakfast

10:00-10:40

Room 2

TT - Automotive and vehicular motion systems

Chairs: Prof. Francesco Biral, Prof. Wataru Ohnishi

Simplified Wheel Slip Modeling and Estimation for Omnidirectional Vehicles *Bastiaan Vandewal, Joris Gillis, Goele Pipeleers, Jan Swevers*

An Optimal Torque Distribution Strategy Using Efficiency Maps of Front and Rear Drivetrain for Electric Vehicles *Kiho Jeon, Jung Hyun Choi, Sehoon Oh*

10:00-12:20

Room 1

SS - Intelligent Sensing Applications for Human Assistive Systems

Chairs: Prof. Sota Shimizu, Prof. Hiroshi Igarashi

Haptic Feedback Rover Navigation Based on Positional Gain Adjusting Bilateral Control *Sota Shimizu, Rikuta Mazaki, Tomonori Yamazaki, Hokuto Kurihara, Naoki Motoi, Roberto Oboe, Nobuyuki Hasebe, Tomoyuki Miyashita*

Sliding Mode Control with Disturbance Estimation for Underwater Robot *Naoki Motoi, Daigo Hirayama, Fumito Yoshimura, Adham Sabra, Wai-keung Fung*

Evaluation of Torque-Sensorless Control for a Knee Exoskeleton Using Back-Drivable Actuators *Kenichiro Mori, Yasutaka Fujimoto*

Estimation of Jacobian Matrix without accelerometer on Omnidirectional Mobile Walker *Kentaro Ominato, Toshiyuki Murakami*

Evaluating the Equivalence between Nonlinear Friction and Backlash in Two-Inertia Systems *Juan Padron, Yuki Yokokura, Kiyoshi Ohishi*

Sunday, 20 February 2022	
	<p><i>Toshimasa Miyazaki, Yusuke Kawai</i> Analysis of the Relationship Between Calcium Ion Concentration Ratio and Behavior in Neural Activity of the Brain <i>Ryota Sunami, Yasue Mitsukura</i> Automatic Deceleration Detection System from Fetal Heart Rate obtained by CTG <i>Hiroko Yamamoto, Yasue Mitsukura</i></p>
10:40-12:20	<p>Room 2</p> <p>SS - Robot Environment Interaction - 1 Chairs: Prof. Emre Sariyildiz, Prof. Takahiro Nozaki A Unified Robust Motion Controller Synthesis for Compliant Robots Driven by Series Elastic Actuators <i>Emre Sariyildi</i> Design Constraints of Disturbance Observer-based Motion Control Systems are Stricter in the Discrete-Time Domain <i>Emre Sariyildi</i> Velocity and Attitude Control of Quadcopter with Suspended-payload using Disturbance Observer with Payload Inclination Suppression <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 <i>Hinako Handa, Takahiro Nozaki</i> Recognition of Environmental Impedance Configuration by Neural Network Using Time-Series Contact State Response <i>Kazuki Yane, Takahiro Nozaki</i></p>
12:30-13:30	<p>Plenary meetings</p> <p>Plenary 3 - Presenter: Prof. Makoto Iwasaki - Talk title: Practical Motion Control Approaches for Industrial Positioning Devices with Strain Wave Gearing Abstract:</p> <p>The keynote speech presents practical motion controller design approaches for precision positioning devices including strain wave gearing, e.g. industrial multi-axis robots, precision rotation stages, etc. Since HarmonicDrive® gears (HDGs), a typical strain wave gearing, inherently possess nonlinear properties known as Angular Transmission Errors (ATEs) due to structural errors and flexibility in the mechanisms, the ideal positioning accuracy corresponding to the apparent resolution cannot be essentially attained at the output of gearing in the devices. In addition, mechanisms with HDGs generally excite resonant vibrations due to the periodical disturbance by ATEs, especially in the condition that the frequency of synchronous components of ATE corresponds to the critical mechanical resonant frequency. The speech, therefore, focuses on the motion controller design techniques to improve the performance deteriorations in positioning accuracy and vibration suppression. In the compensator design, under the assumption that the accurate mathematical models for ATE can be obtained, model-based feedforward as well as robust feedback control approaches have been introduced to improve the positioning performance, considering together with sensor allocations in the mechanisms. The proposed approaches have been applied to precision motion control of actual devices as servo actuators, and verified through numerical simulations and experiments.</p>

Sunday, 20 February 2022

	<p>Biography:</p> <p>Makoto Iwasaki received Dr. Eng. degrees in electrical and computer engineering from Nagoya Institute of Technology, Nagoya, Japan, in 1991. Since 1991, he has been with the Department of Computer Science and Engineering, Nagoya Institute of Technology, where he is currently a Professor.</p> <p>As professional contributions of the IEEE/IES, he has been an AdCom member in term of 2010 to 2019, a Technical Editor for IEEE/ASME TMEch from 2010 to 2014, an Associate Editor for IEEE TIE since 2014, a Co-Editors-in-Chief for IEEE TIE since 2016, a Vice President for Planning and Development in term of 2018 to 2021, respectively. He is IEEE fellow class 2015 for "contributions to fast and precise positioning in motion controller design".</p> <p>He has received academic and technological awards, such as the Best Paper Award of Trans of IEE Japan in 2013, the Technical Development Award of IEE Japan in 2017, the Technology Award of the Japan Society for Precision Engineering in 2018, and the Commendation for Science and Technology by the Japanese Minister of Education in 2019, respectively.</p> <p>His current research interests are the applications of control theories to linear/nonlinear modeling and precision positioning, through various collaborative research activities with industries.</p> <p>Chairs: Prof. Seiichiro Katsura</p>
13:45-14:15	<p>Plenary meetings</p> <p>ICM 2023 Announcement</p>
14:30-14:50	<p>Room 1</p> <p>SS - Intelligent Sensing Applications for Human Assistive Systems</p> <p>Chairs: Prof. Sota Shimizu, Prof. Hiroshi Igarashi</p> <p>Development of Capacitive Coupled Electrocardiograph in the State of Wearing Clothes <i>Naoki Ishiyama, Ryoto Fujita, Yuki Nagatsu, Hideki Hashimoto</i></p>
14:30-16:10	<p>Room 2</p> <p>SS - Robot Environment Interaction - 2</p> <p>Chairs: Prof. Giulia Michieletto, Prof. Takahiro Nozaki</p> <p>Centroidal Momentum Observer: Towards Whole-Body Robust Control of Legged Robots Subject to Uncertainties <i>Dilay Yesildag Oral, Duygun Erol Barkana, Barkan Ugurlu</i></p> <p>Estimating Environment Parameters for Teleoperation System with Time Delay <i>Eray Baran, Fatimah Jabbar Majeed, Hafiz Huzaiifa Azeem</i></p> <p>A New Artificial Potential Field Based Global Path Planning Algorithm for Mobile Robot Navigation <i>Eray Baran, Hamzah Al Jabari, Abdulrahman Alobahji</i></p> <p>Operability Improvement of Human-Robot Collaboration by Human-Adaptive Impedance Control Based on Human Arm Stiffness Estimation <i>Miho Shimizu, Misaki Hanafusa, Jun Ishikawa</i></p> <p>Towards a Low-Cost Robot Navigation Approach based on a RGB-D</p>

Sunday, 20 February 2022	
	Sensor Network <i>Giulia Michieletto, Stefano Michieletto, Massimiliano Bertoni</i>
14:50-16:30	<p>Room 1</p> <p>TT - Advanced motion control in mechatronics and robotics - 3</p> <p>Chairs: Prof. Angelo Cenedese, Prof. Mikael Norrlof</p> <p>Modeling and Identification of Hysteresis in Robot Joints with Cycloidal Drives <i>Patrick Mesmer, Patrick Nagel, Armin Lechler, Alexander Verl</i></p> <p>A feedback control scheme for improving path accuracy of industrial manipulators based on gearbox output sensing <i>Silke Klose, Arne Wahrburg</i></p> <p>Two-degree-of-freedom Robust Feedback Control of a Sliding Gate Automation <i>Daniel Cunico, Luca Zaccarian, Angelo Cenedese, Mauro Borgo</i></p> <p>Multi-stage Optimal Control Problem Formulation for Drone Racing Through Gates and Tunnels <i>Mathias Bos, Wilm Decré, Jan Swevers, Goele Pipeleers</i></p> <p>Development of a flexible link setup for an advanced linear control theory course <i>Laurens Jacobs, Wilm Decré, Jan Swevers, Goele Pipeleers</i></p>
16:30-17:00	<p>Plenary meetings</p> <p>AMC 2022 Closing Ceremony</p>

Yoshimura, Fumito	10	Hasebe, Nobuyuki	10
Al Jabari, Hamzah	12	Hashimoto, Hideki	6, 12
Alobahji, Abdulrahman	12	Hatta, Yoshiyuki	3
Asai, Hiroshi	5, 6	Higuchi, Naotoshi	5
Asoda, Seiji	5	Hirata, Mitsuo	3
Atsumi, Takenori	3	Hirayama, Daigo	10
Azeem, Hafiz Huzaifa	12	Hirche, Sandra	6
Bandyopadhyay, Bijnan	10	Hohmann, Sören	6
Bertoni, Massimiliano	12	Holmberg, Mikael	3
Borgo, Mauro	13	Iida, Wataru	6
Bosselaar, Marcel	8	Isaoka, Yoshihiro	9
Butler, Hans	10	Ishikawa, Jun	12
Castillo Garcia, Pedro	9	Ito, Kazuaki	3
Cenedese, Angelo	13	Iwasaki, Makoto	3
Choi, Jung Hyun	10	Jurvanen, Janne	3
Correa Victorino, Alessandro	9	Katsura, Seiichiro	6
De Pascali, Luca	6	Kawai, Yusuke	10
Decré, Wilm	9, 13	Kawana, Hiromasa	5
Erens, Gerben	10	Kazuhiro, Yubai	3
Erhart, Sebastian	6	Kitamura, Tomoya	3, 6
Erol Barkana, Duygun	12	Kobayashi, Ryotaro	6
Fujimoto, Hiroshi	3, 9	Kollár, Zsolt	9
Fujimoto, Yasutaka	3, 10	Komada, Satoshi	3, 6
Fujita, Ryoto	12	Kostić, Dragan	10
Fung, Wai-keung	10	Kurihara, Hokuto	10
Gillis, Joris	5, 9, 10	Launis, Sirpa	5
Goergen, Yannik	3	Lazar, Mircea	10
Guarino Lo Blanco, Corrado	8	Lechler, Armin	13
Hamajima, Tatsuya	3	Majeed, Fatimah Jabbar	12
Hanafusa, Misaki	12	Mattila, Jouni	5
		Mazaki, Rikuta	10
		Michieletto, Stefano	12
		Mitsukura, Yasue	11

Miyashita, Tomoyuki	10	Seki, Kenta	3
Miyazaki, Toshimasa	6, 10	Seminario, Renzo	10
Motoi, Naoki	10	Shiroyama, Yoshitaka	3
Motzki, Paul	3	Sugihara, Kei	3
Murakami, Toshiyuki	3, 5, 6, 10, 11	Sun, Xiaobai	5
Mustalahti, Pauli	5	Swevers, Jan	5, 9, 10, 13
Nagatsu, Yuki	12	Swinkels, Bas	10
Nagel, Patrick	13	Tamellin, Iacopo	5
Niemelä, Matias	3	Terada, Yuki	9
Nozaki, Takahiro	3, 5, 6, 9, 11	Trevisani, Alberto	5
Oboe, Roberto	10	Ubeda, David	5
Oh, Sehoon	3, 10	Ugurlyu, Barkan	12
Ohishi, Kiyoshi	6, 10	van Duivenbode, Jeroen	10
Ohnishi, Kouhei	3, 5, 6	van Es, Robin	10
Ohnishi, Wataru	3	Verl, Alexander	13
Oomen, Tom	8, 10	Vermulst, Bas	10
Padron, Juan	6	Wahrburg, Arne	13
Paya, Luis	5	Watermann, Lars	10
Pipeleers, Goele	5, 9, 10, 13	Weise, Christoph	10
Poot, Maurice	10	Witvoet, Gert	10
Portegies, Jim	10	Xavier, Nithin	10
Pousseur, Hugo	9	Xu, Duo	10
Puerto, Rafael	5	Yabui, Shota	3
Quijada-Fernandez, Andres	5	Yamada, Takayoshi	3
Raiser, Timon	6	Yamazaki, Tomonori	10
Reinoso, Oscar	5	Yashiro, Daisuke	3, 6
Richiedei, Dario	5	Yokokura, Yuki	6, 10
Rizzello, Gianluca	3	Yubai, Kazuhiro	6
Sabra, Adham	10	Zaccarian, Luca	6, 13
Saito, Yuki	3, 5		
Sakata, Koichi	3		
Sato, Junya	3		
Schmitt, Christian	10		

