数学与系统科学研究院学术报告

报告题目：Recent research activities in the Laboratory for Robotics and Intelligent Control Systems of the University of Zagreb

报 告 人：Stjepan Bogdan（UNIZG-FE)

时间地点：9月4日上午10:00—10:40，N702

摘要：

In this talk we present current research activities on cooperative robotic systems at Laboratory for Robotics and Intelligent Control Systems (LARICS), Faculty of electrical engineering and computing, University of Zagreb. During presentation we will give an overview of the lab members, existing equipment, together with an outline of active research projects. Main emphasis will be on i) humanoid robotics and its usage in diagnostics of autism, ii) cooperative aerial robotics and aerial manipulations, iii) decentralized control of autonomous vehicles in large warehouse facilities, and iv) collective bio-hybrid adaptive systems.

报告人简介：

**Stjepan Bogdan** is a full professor at UNIZG-FER. He has been involved as a researcher and as a leading scientist in various projects financed by the government and industry. He spent 1996/97 as a visiting researcher at the Automation and Robotics Research Institute, the University of Texas at Arlington, under supervision of Prof. Frank L. Lewis. Currently he is the Coordinator of two international research projects and WP leader of the EU FP7 projects ACROSS and ASSISI\_bf. His research interest is in the fields of unmanned aerial vehicles, intelligent systems, robotics and discrete event systems. Stjepan Bogdan published 3 books, 40 journal papers and book chapters, and over 120 conference papers. He has served as an associate editor of IEEE Trans. on Automation Science and Engineering, and is serving as associate editor of J. of Intelligent and Robotic Systems, J. of Control Theory and Applications, Trans. of the Institute of Measurement and Control, and Intern. Review of Mechanical Engineering (IREME). He is Editor of CRC Press/Taylor&Francis Group book series on Automation and Control Engineering, and serves as Croatian representative in European Control Association (EUCA) and EU Space Surveillance and Tracking (SST) Committee.

数学与系统科学研究院学术报告

报告题目：Formability of Multi-agent Systems Using Adaptive Parameter-Dependent Potential Functions

报 告 人：**Ivana Palunko**（University of Zagreb)

时间地点：9月4日上午10:40—11:30，N702

摘要：

In this talk we will focus on formability of multi-agent control approach based on Gaussian potential functions, each parametrized by an agent-related control parameter. This results in different characteristics of attractive and repulsive forces among agents and targets, as well as among agents themselves and dependence of the formation’s potential structure on a change of agent’s configurations. The undesired stable equilibria could be eliminated by mutual interaction of the agents and targets, i.e., by changing the characteristics of elementary potential functions. As a possible solution we propose an adaptive algorithm of the agent-related control parameter.

报告人简介：

**Ivana Palunko** is a postdoctoral researcher at the Department of Control and Computer Engineering, University of Zagreb, Faculty of Electrical Engineering and Computing (FER). She graduated from FER with a Masters degree (Dipl.-Ing.) in Electrical Engineering in 2007., majoring in Control Systems. In August 2008, she enrolled in the Ph.D program, the Control Systems major, at the Department of Electrical and Computer Engineering, University of New Mexico (UNM), Albuquerque, NM where she defended her Ph.D dissertation in August 2012. The tools utilized in her research are: modeling of nonlinear systems, nonlinear control, Lyapunov stability, adaptive control, bifurcation theory, optimal control, reinforcement learning, optimization theory, trust-based decentralized control.

数学与系统科学研究院学术报告

报告题目：Realistic Information in Control Systems - Intermittent, Delayed and Distorted

报 告 人：Domagoj Tolić（University of Zagreb)

时间地点：9月5日上午10:00—10:40，N514

摘要：

This talk investigates detrimental effects that realistic information exchange in Networked Control Systems (NCSs) has on the control performance. In particular, we address intermittent, delayed and distorted information exchange. First, previous results regarding event- and self-triggered control are presented for plant-controller settings. Subsequently, the current progress regarding the extension of these results towards Multi Agent Systems (MASs) is provided. Lastly, several open topics pertaining to MASs in degraded communication environments are outlined for future collaboration.

报告人简介：

Domagoj Tolić is a postdoctoral researcher in the Research Centre for Advanced Cooperative Systems (ACROSS) at the Department of Control and Computer Engineering, University of Zagreb, Faculty of Electrical Engineering and Computing (FER). He graduated from FER with a Masters degree (Dipl.-Ing.) in Electrical Engineering in 2007., majoring in Control Systems. In addition, he graduated from the Mathematics Department of the University of Zagreb with a Bachelor Degree in Mathematics in 2008. Afterwards, he enrolled in the Ph.D program, the Control Systems major, at the Department of Electrical and Computer Engineering, University of New Mexico (UNM), Albuquerque, NM. He completed his Ph.D program in August 2012. His research focuses on stability and estimation under intermittent information for nonlinear control systems. The developed theory is applied to problems in the area of multi-agent robotics. More details are found at <http://larics.rasip.fer.hr/?page_id=695>

数学与系统科学研究院学术报告

报告题目：Trust Based Self-Organizing Network Control

报 告 人：Tomislav Haus（University of Zagreb)

时间地点：9月5日上午10:40—11:30，N514

摘要：

Distributed cooperation is found in various applications such as multi-robot systems, gossip protocols, cooperative sensing, etc. In these systems, each agent is provided with a set of simple decision-making algorithms or dynamics such that, taking action relaying on local information, the group achieves a certain goal. In order to formally incorporate capabilities and intentions of interacting agents, the notion of trust is included in the network model. In this talk a mechanism for decentralized trust-based self-organizing network control will be presented. The control objective is to reach an agreement throughout the network regarding each agent’s suitability for a certain task, represented with its trust value. Since this mechanism is decentralized, scenarios with unequal trusts values toward one agent need to be handled with caution in order not to compromise the collective behavior. To that end, an adaptive control concepts are employed when negotiating trust values. A formal proof of convergence of the proposed adaptive mechanism will be discussed for the network topologies that can be represented with both undirected graphs and directed weighted graphs.

报告人简介：

**Tomislav Haus** is research and teaching assistant at Faculty of Electrical Engineering and Computing (FER), University of Zagreb. His PhD research is conducted under supervision of prof. Stjepan Bogdan. His research interests are in the fields of robotics, multi-agent systems and unmanned aerial vehicles. He is involved in two international research projects and one national project. In the ASSISI\_bf project, financed by European Union The Seventh Framework Programme (EU-FP7), he is working on design and development of the mechatronic system capable of interacting with biological societies of bees. Within the project Human-in-the-loop Control of Multi-agent Aerial Systems Under Intermittent Communication (AFRL) his efforts are focused on development of a trust-based cooperative protocols. In the national project Cooperative control of heterogeneous robotic system he is working on the implementation of the coordination algorithms between autonomous aerial vehicle and autonomous surface vehicle. So far he is authored or co-authored 5 conference papers and 3 journal papers.