Online Seminar Series for IFAC TC 1.2 Adaptive & Learning Systems

Organizers: Tiago Roux Oliveira, State University of Rio de Janeiro – UERJ, TC 1.2 Chair
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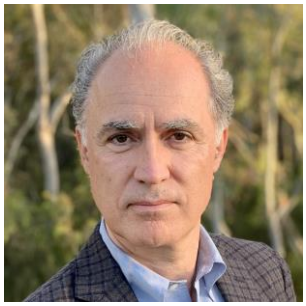
Details of the First Seminar



Title: The Magical Worlds of Adaptive Stabilization and Optimization

Speaker: Professor Miroslav Krstic, University of California, San Diego

Time: March 14, 2022 (8am Pacific Daylight Time, 3pm UTC)

Abstract: Adaptive control and machine learning have converged in recent years through topics like reinforcement learning and online optimization. But they originate from different engineering goals and mathematical techniques. As their names indicate, adaptive control primarily deals with control, in a real-time feedback loop, with learning superimposed to it but not a goal unto itself, whereas machine learning has recently begun venturing from learning in a static or open-loop sense into feedback applications. In this talk I will touch on two classical, but also currently flourishing, research directions, both belonging to what is regarded broadly as adaptive control, and in which learning is the means but not the objective. One of the two directions is the model-based adaptive stabilization, most prominently represented over the last three decades by adaptive backstepping designs. The other research direction is model-free adaptive optimization, also known as “extremum seeking,” invented a century ago but made rigorous and broadly applicable over the last two decades. I include illustrations from robotics, biology, road traffic, and semiconductor manufacturing.

Bio: Miroslav Krstic is Distinguished Professor of Mechanical and Aerospace Engineering, holds the Alspach endowed chair, and is the founding director of the Cymer Center for Control Systems and Dynamics at UC San Diego. He also serves as Senior Associate Vice Chancellor for Research at UCSD. As a graduate student, Krstic won the UC Santa Barbara best dissertation award and student best paper awards at CDC and ACC. Krstic has been elected Fellow of seven scientific societies - IEEE, IFAC, ASME, SIAM, AAAS, IET (UK), and AIAA (Assoc. Fellow) - and as a foreign member of the Serbian Academy of Sciences and Arts and of the Academy of Engineering of Serbia. He has received the Richard E. Bellman Control Heritage Award, SIAM Reid Prize, ASME Oldenburger Medal, Nyquist Lecture Prize, Paynter Outstanding Investigator Award, Ragazzini Education Award, IFAC Nonlinear Control Systems Award, Chestnut textbook prize, Control Systems Society Distinguished Member Award, the PECASE, NSF Career, and ONR Young Investigator awards, the Schuck (’96 and ’19) and Axelby paper prizes, and the first UCSD Research Award given to an engineer. Krstic has also been awarded the Springer Visiting Professorship at UC Berkeley, the Distinguished Visiting Fellowship of the Royal Academy of Engineering, the Invitation Fellowship of the Japan Society for the Promotion of Science, and four honorary professorships outside of the United States. He serves as Editor-in-Chief of Systems & Control Letters and has been serving as Senior Editor in Automatica and IEEE Transactions on Automatic Control, as editor of two Springer book series, and has served as Vice President for Technical Activities of the IEEE Control Systems Society and as chair of the IEEE CSS Fellow Committee. Krstic has coauthored fifteen books on adaptive, nonlinear, and stochastic control, extremum seeking, control of PDE systems including turbulent flows, and control of delay systems.

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