Extremum Seeking and Aircraft Endurance

ABSTRACT

Extremum seeking (ES) is a method for solving optimization problems without the knowledge of the operating map, using only measurements of the output of the map. Invented several decades before genetic algorithms and other heuristic approaches for solving static optimization problems in a model-free manner, ES is well suited for real-time implementations, on plants with significant dynamics, and with convergence rate guarantees. I will overview recent developments in ES theory and applications, including algorithms for source seeking with autonomous vehicles operating in GPS-denied environments, algorithms for non-cooperative games in economics, extensions of ES from gradient to Newton based updates, and an application to maximizing aircraft endurance with the help of atmospheric turbulence.

BIO: Miroslav Krstic is the Daniel L. Alspach chair in Dynamic Systems and Control, the Harold W. Sorenson Distinguished Professor, and the founding director of the Cymer Center for Control Systems and Dynamics at UC San Diego. He is a recipient of the PECASE, NSF Career, and ONR Young Investigator Awards, as well as the Axelby and Schuck Paper Prizes. Krstic was the first recipient of the UCSD Research Award in the area of engineering and has held the Russell Severance Springer Distinguished Visiting Professorship at UC Berkeley. He is a Fellow of IEEE and IFAC and serves as Senior Editor in IEEE Transactions on Automatic Control and Automatica. He has served as Vice President of the IEEE Control Systems Society. Krstic has co-authored eight books on adaptive, nonlinear, and stochastic control, extremum seeking, control of PDE systems including turbulent flows, and control of delay systems.

Drinks will be served at 3:45 p.m.