TEXAS A&M UNIVERSITY
Department of Electrical & Computer Engineering

Friday, Oct. 30, 2020 | 4:15 – 5:05 p.m. CST

Bio-Group Seminar | Meeting ID: 514 754 727 | https://tamu.zoom.us/j/514754727

Optimal Control for Evolutionary Dynamics

Abstract

Controlling an evolving population is relevant to improving activity of molecules and enzymes, breeding experiments of living systems, and in devising public health strategies to suppress disease progression. In this talk, I will consider two evolutionary models. The first model is going to consider coupled evolution of strategies, in the sense of evolutionary game theory, and the environment. In this setting the goal of the designer is to avoid a tragedy, i.e., depletion of the environment, by inducing cooperation in the population. We will uncover potential unintended consequences of the optimal control strategies by analyzing the controlled dynamics. The second model will consider a simple model for the evolution of traits within a population. The objective in this scenario would be to artificially derive the population to a desired set of traits. We will consider optimal selection when monitoring is intermittent. We will provide information theoretic bounds on the ability to control versus monitoring intervals.

Ceyhun Eksin, Ph.D.

Assistant Professor, Industrial and Systems Engineering, Texas A&M University

Ceyhun Eksin is an assistant professor at Industrial and Systems Engineering Department in Texas A&M University. He received his Ph.D. in Electrical and Systems Engineering from the University of Pennsylvania in 2015, and was subsequently a Postdoctoral Fellow at the Georgia Institute of Technology affiliated with both the School of Electrical & Computer Engineering and the School of Biological Sciences. His research interests are in the areas of distributed optimization, network science, game theory and control theory. His current research focuses on game theoretic modeling and optimization of multi-agent systems in biological, communication and social networks.