SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING
Website: https://cde.nus.edu.sg/ece

Area: Control, Intelligent Systems & Robotics

Host: Associate Professor Xiang Cheng

TOPIC	:	**On Optimal Robust Set Stabilization of Probabilistic Boolean Control Networks: a Bigraph Approach**
SPEAKER	:	**Mr. Huang Zheyu** **Graduate Student, ECE Dept, NUS**
DATE	:	**Friday, 10 February 2023**
TIME	:	**2.00PM to 3.00PM**
VENUE	:	**Block E4, E4-08-22A** **ACT Lab Project Room** **College of Design and Engineering, NUS** **Alternatively,** **Join Zoom Meeting:** **https://nus-sg.zoom.us/j/88190082642** **Meeting ID: 881 9008 2642** **Passcode: 168007**

ABSTRACT

The speaker presents new methods on robust set invariance, set stabilizability, and set stabilization of Boolean control networks (BCNs) subject to arbitrary disturbance inputs. Unlike the algebraic methods, we approach these problems from a graphical perspective by viewing a state as a vertex and a state transition as an edge. The effect of disturbances is then described by two outgoing edges given one state and one control input. We first generalize the predecessor definition in graphs and propose the concept of the robust predecessor (RP) of a state set, based on which a simple iterative algorithm is developed to quickly identify the largest robust invariant set. By taking the stagewise cost as the edge weight of a graph, we then incorporate the RP concept into Dijkstra's shortest path algorithm and provide constructive procedures to determine the state feedback gain matrix for robust optimal set stabilization of BCNs. The same procedures can certify whether a BCN is globally robustly stabilizable and, if not, what is the robust set stabilizability domain.

BIOGRAPHY

Zheyu Huang received the B.S. degree from Institute for Interdisciplinary Information Sciences, Tsinghua University in 2022. He is currently a Master of Engineering student at the Department of Electrical and Computer Engineering, National University of Singapore. His research interests include operations research, online learning algorithms and function approximation methods.