



TOPIC	Developing a Robust, Computationally Efficient Fuzzy Type-2 Logic System
ORGANIZERS	Student Leadership Council and Faculty of ACIT Institute and TECHLAV Center
AREA	Fuzzy Systems, Control, Testing and Evaluation
SPEAKER	Abel Hailemichael
DATE	Friday 11, 2016
TIME	3:00 – 4:00 PM (EST)
VENUE	Fort IRC 410, North Carolina A&T State University, UTSA and SIPI will be joining through video-conferencing
FEES	No Charge

#### SYNOPSIS

Real world control, testing, and evaluation systems suffer from uncertainties that arise from different sources such as: sensors, actuators, environmental conditions, as well as linguistic uncertainties. Type-2 Fuzzy Logic Systems are powerful tools capable of handling, and mathematically expressing the effects of these uncertainties. However, general Type-2 Fuzzy Logic Systems are computationally expensive and thus have rarely been used for real world control, testing, and evaluation applications. To overcome this challenge, this talk presents a novel approach for designing a computationally effective Type-2 Fuzzy logic System, which uses Interval Type-2 Fuzzy Sets for capturing the uncertainty of the system’s inputs. Integrated with the proposed technique is the employment of Takagi-Sugeno-Kang (TSK) and the uncertainty bound techniques. The technique has been applied to the control of an inverted pendulum and the simulation results will be discussed, comparing the performance of the proposed technique with Fuzzy Type I and classical control techniques.

#### ABOUT THE SPEAKER



Abel Hailemichael received his Bachelor of Electrical and Electronics Engineering from the Addis Ababa University in 2009. He later received his Master of Science in Electrical Engineering from Polytecnico di Torino, Italy in 2015. In 2016, he joined North Carolina A&T State University to pursue his Ph.D. degree under the advisory of Dr. Ali Karimodini. His research interests include “Testing and Evaluation of Autonomous Vehicles,” “Fuzzy Logic Systems,” “Aerial and Ground Robotics.” He is a member of Autonomous Cooperative Control of Emergent Systems of Systems (ACCESS) Lab and Autonomous Control and Information Technology (ACIT) Institute.