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TECHLAV

TOPIC	Time Delay Estimation for Internet-based Control Systems
ORGANIZERS	Student Leadership Council and Faculty of ACIT Institute and TECHLAV Center
AREA	Mechanical Engineering
SPEAKER	Christopher Thomas, Ph.D. candidate
DATE	Friday 10/14/2016
TIME	3:30 – 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

Teleoperation is a very useful tool when an environment may be too dangerous or out of reach for a human (e.g. space exploration, handling nuclear material, performing small scale precision surgery, etc.). However, there are several problems to be addressed when using teleoperation such as: disruptions, delay, interruptions, and uncertainties. The focus of my talk will be on time delay. When tele-operating systems run through private media variation of the transmission, the delay value is very small. Thus, the delay can be assumed to be constant and can be well modeled. The Internet, on the other hand, is a public and shared resource in which many end users transmit data through the network simultaneously. The route for transmission between two end points is not fixed and varies dynamically. Also, traffic jams may be caused when too many users use the same route simultaneously. The transmission latency of such public network is difficult to estimate and predict. Time delay is one of the critical obstacles in realizing reliable Internet-based process control systems. Using analytical solutions of delay differential equations and time-domain responses, the time delay caused by communication is estimated. These estimated delay values can be used in conjunction with a Smith Predictor controller for stabilizing delayed systems.

ABOUT THE SPEAKER



Christopher Thomas is a PhD Candidate in Mechanical Engineering at North Carolina A&T State University and is currently a graduate research assistant at the ACIT Institute. He received his B.S. from North Carolina A&T State University in Mechanical Engineering in May, 2016. His research interests include control systems, managing time delay, stabilizing unpredictable delayed systems, and UAV teleoperation.