KEXUE ZHANG, Queen's University

Event-Triggered Impulsive Control for Nonlinear Systems

Impulsive control is a control paradigm that uses impulses that are state abrupt changes over negligible time periods to control dynamic systems. Most of the existing results on impulsive control problems focus on time-triggered control strategies. More specifically, the moments when the impulses happen, normally called impulse times, are pre-scheduled which makes time-triggered control strategies simple to implement. To improve the impulsive control efficiency, event-triggered impulsive control has been successfully developed recently, the idea of which is to determine the impulse times or the instants of updating the control signals by a certain event that occurs only when the system dynamics violates a well-designed triggering condition. This talk focuses on the impulsive stabilization of nonlinear systems. We propose two types of event-triggering algorithms to update the impulsive control signals with actuation delays. The first algorithm is based on continuous event detection, while the second type makes decisions about updating the impulsive control inputs according to periodic event detection. Sufficient conditions are derived to ensure asymptotic stability of the impulsive control systems with the designed event-triggering algorithms. Lower bounds of the time period between two consecutive events are also obtained so that the closed-loop impulsive systems are free of Zeno behavior. This is joint work with Elena Braverman (University of Calgary).