Optimal control for networked control systems

Networked control systems where controllers, actuators and sensors are connected via networks come with several advantages but also with new challenges compared to classical control strategies. Two major challenges are random delays and dropouts of transmitted data packets. The goal is the design of optimal control laws for such stochastic setups that handle the random delays and dropouts.

- The networks are modeled via Markov processes; it is assumed that there are upper bounds for the delays and the number of successive dropouts.

- In addition to sending data from the sensors to the controller and from the controller to the actuators, the actuators could send information about received packets back to the controller.

- The plant is a discrete-time LTI system.

- A cost function quadratic in the state and the actuating variable of the plant is minimized.