

Networked Control Systems: Modeling and Design
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Networked Control Systems (NCS) are the integration of physical processes with networked computing units. The design of the control policies must take into consideration the non-idealities introduced by operating systems, communication protocols and physical characteristics of the communication media. In this talk, we first address NCS design using symbolic (i.e. finite) models. Symbolic models that approximate nonlinear NCS with arbitrarily good accuracy are formally derived and the design of symbolic controllers that realize specifications expressed in terms of automata on infinite strings is also illustrated. We then address the design of wireless NCS for the specific case of a *multi-hop* network subject to permanent failures (e.g. malfunction or battery discharge of a communication node, communication link drops, and malicious intrusions). A methodology for the design of scheduling and routing algorithms, which satisfies controllability and observability for any link failure, is presented. Failure detection can be introduced as a step towards more efficient algorithms that can take into consideration the particular failure being observed.