

"Switched Systems and Control" (Module 22)

Daniel Liberzon

May 25 – 29

Schedule:

Monday:		13:30-15:00, 15:30-17:00
Tuesday:	10:00-11:30	13:30-15:00, 15:30-17:00
Wednesday:	10:00-11:30	13:30-15:00, 15:30-17:00
Thursday:	9:00-10:30, 10:30-12:00,	13:30-15:00, 15:30-17:00
Friday:	9:00-10:30, 11:00-12:30	

Outline:

1. Introduction: hybrid & switched systems and their solutions. Definitions, examples.
2. Stability of switched systems: motivation & background. Two types of stability, examples. Background material on stability: Lyapunov, LaSalle, comparison functions, ISS.
3. GUAS and common Lyapunov functions. Commutation relations and stability under arbitrary switching.
4. Systems with special structure (triangular systems, feedback systems). Common weak Lyapunov functions and observability.
5. Multiple Lyapunov functions and slow switching. Multiple weak Lyapunov functions.
6. Switched systems with inputs and outputs: ISS, invertibility.
7. Lyapunov functions for switched systems: computational aspects. Introduction to switching control. Brockett's condition and stabilization of nonholonomic systems.
8. Control with limited information.
9. Supervisory control of uncertain systems.
10. Conclusion: answers to questions, brief discussions of topics not covered, open problems and future directions.

In addition, there will be time slots allocated for student questions and discussions.