ECE 236 / ME 236: Nonlinear Control Systems

Winter 2018, 4 credits

Instructor: Prof. Andrew R. Teel
5119A HFH (ENG I)
893-3616
teel@ece.ucsb.edu

Lectures: TTh: 10:00 – 11:50 am
Phelps 1437

Office Hours: TTh: noon – 1pm (or email or stop by...)
teel@ece.ucsb.edu

Text: H.K. Khalil
Nonlinear Control
Pearson, 2015

Grading: Homework (3 or 4 assignments) 100 %
(Last assignment likely will be comprehensive)

COURSE TOPIC

Nonlinear stability theory and some nonlinear control design.

COURSE OUTLINE

1. Fundamental properties of differential equations
   Existence/uniqueness, finite-escape time, limit cycles, illustrations on 2-d systems Ch. 1-2.

2. Basic stability theory
   Lyapunov functions, linearization, invariance principle, converse theorems, input-to-state stability. Ch. 3-4.

3. Input-output stability
   $L_2$-stability, small-gain theorem, passivity, absolute stability. Chapters 5-7.

4. Selected topics in nonlinear control design
   Normal forms, state feedback stabilization, observers, output feedback Ch. 8-13.

PREREQUISITES

Some knowledge of Linear Systems (ECE 230A /ME 243A) assumed.

COURSE WEB PAGE

http://www.ece.ucsb.edu/~teel/ECE236/

Off campus access:   username: ece236   password: offcampus236