Automatic Control II
Comments and summary

Hints for what is essential

- to understand the course,
- and to perform well at the final exam.
Comments and summary (cont.)

You should

- be able to distinguish between continuous-time (c-t) and discrete-time (d-t) systems!
- be acquainted with basic concepts and properties of linear systems (for c-t & d-t):
  - stability
  - controllability & observability
  - solution of the state equation
  - etc...
- know about system sampling, a.k.a. zero-order-hold (ZOH) sampling
Comments and summary (cont.)

- MIMO systems
- Disturbance models:
  - spectrums, spectral factorization
  - state space models – covariance matrices from Lyapunov equation (c-t & d-t)
- Kalman filter in c-t & d-t:
  - CARE/DARE
  - $P =$ covariance of estimation error
  - innovations, innovations form
Comments and summary (cont.)

- LQ & LQG (c-t & d-t):
  - CARE/DARE
  - *design technique: meaning of Q1, Q2, R1, R2 etc.*

- MPC:
  - *basic principle*
  - *meaning of control horizon, prediction horizon, sampling period*
Aiding material

Aiding material at the final exam:

- Textbooks in automatic control, e.g.
  - Reglerteori – flervariabla och olinjära metoder, Glad and Ljung
  - Reglerteknik – Grundläggande teori, Glad and Ljung (the blue book)

- Mathematical handbooks (e.g. beta), collection of formulas (formelsamlingar)

- Textbooks in mathematics

- Calculators

- Handwritten comments in textbooks are not forbidden

Not allowed: Exercise manual (incl. solutions)
Reglertechnik III (Automatic Control III)

Enhanced understanding of
- MIMO systems
- what can be achieved by use of feedback?
  - Limitations and conflicts
- nonlinear systems

Control design:
- Some different approaches
- Advanced design methods
  - Eg. make $S(s)$ & $T(s)$ as small as possible
- Optimal control

Course homepage:
www.it.uu.se/edu/course/homepage/regtek3/ht13

Examined partly by mini projects
System identification
10hp period 43-44

Models are necessary for
- analysis of
- simulation of
- prediction of
- control design for dynamic systems.

You learn how to design and calibrate models by use of experimental data. Statistical methods and optimization are important tools.

Examined by written exam and a small project.