SF2832 - Mathematical systems theory
Plan for exercise sessions, autumn 2016

Version: December 14, 2016

In general, in the beginning of each exercise sessions there will be a recap of the theory part covered in the lectures. Then we will do some exercises on the board.

Exercise session 1: Linear algebra recap. and linear dynamical systems

   In class: Some basic exercises on linear algebra, 1.4, 1.5
   Recommended: 1.1, 1.7, 1.8, 1.10 and/or 1.11 and/or 1.12 and/or 1.13, 1.9, 1.14

Exercise session 2: reachability and observability

   In class: 2.1, 2.3, 2.6, two exercises on observability, (2.10)
   Recommended: 2.4, 2.5, (2.11), 2.14

Exercise session 3: Stability and realization theory

   In class: 3.2, basic exercise on BIBO-stability, 3.3 a, 4.6 a & b, (3,6, and another exercise on time-varying systems)
   Recommended: 3.1, 3.3 b

Exercise session 4: Realization theory

   In class: 4.6 c - f, example of Kalman decomposition
   Recommended: Foremost, a couple of the exercises 4.1-4.10.

Exercise session 5: Pole assignment and observers

   In class: 5.1, 5.2, basic exercise on multiple input, exercise on not fully reachable system
   Recommended: 5.4, 5.5, 5.9, (5.12)

Exercise session 6: Linear quadratic control

   In class: 6.1, infinite horizon version of 6.1, example of infinite horizon LQ control, 6.8
   Recommended: 6.3, 6.5, 6.4, 6.6, (6.9), (6.11)

Exercise session 7: Kalman filtering

In class: Exam 2009-01-12 question 5, exercise on Kalman filter with deterministic input, (7.2), (exercise on Kalman filter with input = feedback of state estimates)

Recommended: 7.1, 7.7, (exercise given in class on Kalman filter with input = feedback of state estimates)