Session 1

Examples. Concepts. Linearization.

This course will focus on *analysis* of linear systems. Prerequisites are the compulsory undergradute courses in mathematics and control theory. The course on matrix theory is also useful.

Reading Assignment

Rugh Ch 1-2. Use also the first week to look back at the material in Reglerteknik AK. The main new thing is to do linearization along an orbit, rather than at an equilibrium.

Exercises

Exercise 1.1 = Rugh 1.8

Exercise 1.2 = Rugh 1.17

Exercise 1.3 If $A(p)$ is a continuous $n \times n$ matrix function of p, show that its eigenvalues $\lambda_1(p), \ldots, \lambda_n(p)$ depend continuously on p.

Exercise 1.4 = Rugh 2.6

Exercise 1.5 Select an example of a linear systems model/application appearing in your research field, that can be presented at the exercise session.

Hand in problems

Solutions to the following problems should be handed in at the exercise session.

Exercise 1.6 = Rugh 2.13

Exercise 1.7 Draw a block diagam and introduce a minimal state space realization for the transfer function

$$G(s) = \frac{A}{T_1 s + 1}\left(\frac{B}{T_2 s + 1} + \frac{C}{T_3 s + 1} + \frac{Ds}{T_3 s + 1}\right)$$