Syllabus
TTK4115 - Linear System Theory - Fall 2017

Instructors

Lectures : Morten D. Pedersen - *morten.d.pedersen@ntnu.no*

Tutorials : Kristoffer Gryte - *kristoffer.gryte@itk.ntnu.no*

Calendar

Week	Lecture	Material	Tutorial	Handout	Hand in
34	Introduction, solutions to differential equations.	[1]: (1, 2, 4.1-4.2)	Yes	Ex.1, Pr.1	-
35	More on solutions. Matrix exponentials. Equivalent state space representations. Diagonal and Jordan forms.	[1]: (3.4-3.6, 4.1-4.4)	Yes	-	Ex.1
36	Canonical forms and realizations. Discrete-time systems. Summary module 1.	[1]: (2.7-2.8, 3.4-3.6, 4.2-4.5)	Yes	Ex.2	-
37	Controllability. State feedback.	[1]: (6.1-6.2, 6.6, 8.1-8.2, 8.6)	Yes	-	Ex.2
38	More on state feedback. Optimal control.	[1]: (8.1-8.3, 8.6), LQR note		Ex.3	-
39	Observability and observers.	[1]: (6.3, 6.6, 8.4)	Yes	-	Ex.3
40	Observers and output feedback. Summary module 2.	[1]: (8.4, 8.5, 8.7)	Yes	Ex.4	-
41	Canonical decompositions and minimal realizations.	[1]: (6.4, 6.5, 7.1, 7.2)	Yes	-	Ex.4
42	Stability. Summary module 3.	[1]: (3.7, 3.9, 5.1-5.5)	Yes	Pr.2, Ex.5	-
43	Introduction, random variables and processes.	[2]: (1, 2.1-2.14)	Yes	-	Pr.1[1], Ex.5
44	Simulation of stochastic state space systems.	[2]: (3.1-3.6, 3.8-3.11)	Yes	Ex.6	-
45	Kalman filters for continous and discrete systems.	[2]: (4, App.B)	Yes	-	Ex.6
46	Summary module 4.	[2]	Yes	Ex.7	
47	Course summary	-	Yes	-	Pr.2,Ex.7
48-51	Q/A session	-	-	-	Exam: 09.12 (Week 49)

Time and place

Lectures : Tuesdays 8:15-11:00 in S6

Tutorials : Wednesdays 18:15-20:00 in S7

Literature

[1] Chi-Tsong Chen. *Linear system theory and design.* Oxford University Press, New York, 4th international edition, 2014.

[2] Robert Brown. *Introduction to random signals and applied Kalman filtering : with MATLAB exercises.* John Wiley & Sons, Inc., Hoboken, NJ, 4th edition, 2012.

[1] Report hand in and presentation.