Lecture schedule 2019

TTK4130 Modeling and Simulation

March 22, 2019

Week	Date	Theme	Literature
2	07.01	Introduction to Modelica	F: 1, 2
	10.01	More introduction. State-space models, transfer functions. Modeling software, network models.	E: 1.1-1.3, 2.1-2.2 (E:1.4-1.5)
3	14.01	Energy functions, passivity	E: 2.3-2.4
	17.01	More passivity	E: 2.4
4	21.01	Modeling of complex systems. Simulation: Order, test system	F: 3, 4, E: 14.1-14.2
	24.01	Explicit Runge-Kutta methods	E: 14.3-14.4
5	28.01	*Guest lecture – Sebastien Gros (exam relevant)*	-confirmed -
	31.01	Implicit Runge-Kutta methods	E: 14.5
6	04.02	Stability, Padé approximations	E: 14.6
	07.02	Stability, frequency properties, automatic step size adjustment Implementation, BDF and differential-algebraic systems	E: 14.6-14.7 E: 14.8, 14.11, 14.12
7	11.02	*Guest lecture: Erlend Kristiansen, Comsol Multiphysics*	-confirmed -
	14.02	Vectors, dyadics, rotation matrices	E: 6.1-6.4
8	18.02	Euler angles, angle axis, Euler parameters	E: 6.5-6.7
	21.02	Angular velocities, Kinematic differential equations	E: 6.8-6.9
9	25.02	Kinematics of a rigid body, Newton-Euler equations of motion	E: 6.12-6.13, 7.3
	28.02	Newton-Euler equations of motion	E: 7.3
10	04.03	Modelica.Multibody, Friction	E: 7.3, E:5
	07.03	Friction, Electrical motors	E: 5, E: 3.1-3.4
11	11.03	Electrical motors, Lagrange equations of motions	E: 3.1-3.4, E: 7.7
	14.03	Lagrange equations of motion	E: 7.7, 8.1-8.2
12	18.03	Lagrange equations of motion, recap, examples	E: 7.7, 8.1-8.2
	21.03	Process modelling and balance laws, I	E: 10.4, 11.1-4 (+ slides)
13	25.03	Process modelling and balance laws, II	E: 10.4, 11.1-4 (+ slides)
	26.03	Hydraulic motors, transmission lines	E: 4.1-4.6
	28.03	Process modelling and balance laws (closure relations)	E: 10.4, 11.1-4
14	01.04	Process modelling and balance laws (differential balance)	E: 10.4, 11.1-4
	04.04	No lecture (excursion)	
15	08.04	No lecture (excursion)	
	11.04	No lecture (excursion)	
16	15.04	No lecture (excursion)	
	18.04	No lecture (Easter)	
17	22.04	No lecture (Easter)	
	25.04	No lecture	
18	29.04	Recap	
	02.05	Discussion - possible topics: past Exams	

E: "Modeling and Simulation for Automatic Control" by O. Egeland and J.T. Gravdahl

F: "Introduction to Modeling and Simulation of Technical and Physical Systems with Modelica" by P. Fritzon