Lecture schedule 2018

TTK4130 Modeling and Simulation

January 9, 2018

Week	Date	Theme	Literature
2	08.01	Introduction to Modelica	F: 1, 2
	11.01	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	15.01	Energy functions, passivity	E: 2.3-2.4
	18.01	More passivity	E: 2.4
4	22.01	Modeling of complex systems. Simulation: Order, test system	F: 3, 4, E: 14.1-14.2
	25.01	Explicit Runge-Kutta methods	E: 14.3-14.4
5	29.01	Implicit Runge-Kutta methods	E: 14.5
	01.02	Stability, Padé approximations	E: 14.6
6	05.02	Stability, frequency properties, automatic step size adjustment	E: 14.6-14.7
		Implementation, BDF and differential-algebraic systems	E: 14.8, 14.11, 14.12
	08.02	Vectors, dyadics, rotation matrices	E: 6.1-6.4
7	12.02	Euler angles, angle axis	E: 6.5-6.6
	15.02	Euler parameters, angular velocities	E: 6.7-6.8
8	19.02	Kinematic differential equations	E: 6.9
	22.02	Kinematics of a rigid body , Newton-Euler equations of motion	E: 6.12-6.13, 7.3
9	26.02	Newton-Euler equations of motion, Modelica.Multibody	E: 7.3
	01.03	Friction	E: 5
10	05.03	Electrical motors	E: 3.1-3.4
	08.03	Lagrange equations of motion	E: 7.7, 8.1-8.2
11	12.03	Lagrange equations of motion, recap, examples	E: 7.7, 8.1-8.2
	15.03	Guest lecture: Erlend Kristiansen, Comsol Multiphysics (?)	
12	19.03	No lecture (excursion)	
	22.03	No lecture (excursion)	
13	26.03	No lecture (excursion)	
	29.03	No lecture (Easter)	
14	02.04	No lecture (Easter)	
	05.04	Process modelling and balance laws, I	E: 10.4, 11.1-4 (+ slides)
15	09.04	Process modelling and balance laws, II	E: 10.4, 11.1-4 (+ slides)
	12.04	Process modelling and balance laws (differential balance)	E: 10.4, 11.1-4
16	16.04	Process modelling and balance laws (closure relations)	E: 10.4, 11.1-4
	19.04	Guest lecture: Erlend Kristiansen, Comsol Multiphysics (?)	
17	23.04	Hydraulic motors, transmission lines	E: 4.1-4.6
	26.04	Not dedided	
18	30.04	Not decided	
	03.05	Not decided	

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