Gen IMS II
Spring term 2018
Date: Feb. 02, 2018

Course CH09-320104
M. Bode
Due: Fri, Feb. 09, 2018, in class

Homework 1

Homework problems are supposed to help you digest the content of the lecture, and they will be graded. It is important that you manage to solve them on your own. Before you write your solutions, you may of course ask questions, and discuss things.
It is required that your solution is clear and readable. Apply definitions properly, and give explanations for what you are doing.

Task 1 (100) Charge a Capacitor

Consider the circuit, below.

a) Write the model , i.e., write an ode. in terms of the voltage V_C across the capacitor. – Explain all your steps.

b) In order to solve the model use the following ansatz: $V_C(t) = A + B\mathrm{e}^{\lambda t}$. In order to do so, plug in and find (also state) arguments that allow you to solve for A, B, and λ. Assume an initial value $V_C(t = 0) = 0$.

c) Choose an appropriate time interval, and sketch the function $V_C(t)$ for $V_S = 10V$, $R = 1k\Omega$, $C = 100\mu F$.