

MATH 267 (Sections A3, C-1) Homework No. 4

Reading

Section 4.1 (May omit from Example 1.9 until the end of page 167)

Section 4.2

Section 4.3

Section 3.4

Section 4.4 (May omit examples 4.16, 4.17, 4.18)

Suggested Problems

Section 4.3, Exercises 19, 21, 23, 25.

Section 4.4 Exercises 1,3,5 (part ii only)

Problems to be handed in (due Monday February 14-th)

Problem 1 (7 points)

Solve the initial value problem

$$x'' + 3x' + 2x = 0, \quad x(0) = 1, \quad x'(0) = 0.$$

Problem 2 (7 points)

Solve the initial value problem

$$x'' + 4x' + 5x = 0, \quad x(0) = 1, \quad x'(0) = 0.$$

Problem 3 (7 points)

Solve the initial value problem

$$x'' + 4x = 0, \quad x(0) = 1, \quad x'(0) = -1.$$

Express the solution in terms of phase and amplitude.

Problem 4 (9 points)

As an engineer, you have to design an RLC circuit. In the chosen system of units, the value of the inductance L is given by 2 and the value of the capacitance C is equal to 3. Say for what values of the resistance R the circuit will present:

1. No damping
2. under-dumping
3. over- damping
4. critical damping.

and sketch a possible qualitative behavior of the current in the four cases.