

MATH 267 (Section E1) Homework No. 3

Reading

Sections 3.1-3.5.

Suggested Problems

Section 3.1: Exercises 1,3,9,10

Section 3.2: Exercises 1,7,10,11,21

Section 3.3: Exercises 1,3

Section 3.4: Exercises 1,3,7,9,17,19

Section 3.5: Exercises 1, 3, 11, 12

Problems to be handed in in class on Thursday February 8

Problem 1 Consider the following second order boundary value problem

$$\begin{aligned}t^2 y'' + 2ty' - 2y &= 0, \\ y(1) &= 0, \quad y'(1) = 1.\end{aligned}$$

- Give an interval where the solution is guaranteed to exist and be unique.
- Some of the following functions are solutions of this equation

$$y_1 = t, \quad y_2 = t^{-3}, \quad y_3 = 2t, \quad y_4 = t^{-2}, \quad y_5 = \cos(t).$$

Find the solution of the boundary value problem.

Problem 2 Solve the following second order boundary value problem

$$\begin{aligned}y'' + 2y' + 4y &= 0, \\ y(1) &= 0, \quad y'(1) = 1.\end{aligned}$$

Problem 3 Solve the following second order boundary value problem

$$\begin{aligned}y'' + 4y' + 4y &= 0, \\ y(0) &= -1, \quad y'(0) = 1.\end{aligned}$$