

MATH 267 (Section E1) Homework No. 1

Reading

Sections 2.1, 2.2 (may omit pg. 47), 2.3 (only Examples 1 and 2).

Suggested Problems

Section 2.1: Exercises 13, 14, 16 (use method of integrating factor)

Section 2.2: Exercises 1, 2, 6, 9, 15

Section 2.3: Exercise 1.

Problems to be handed in in class on Thursday January 18

Problem 1 Use the method of the integrating factor to solve the Initial Value Problem

$$y' - ty = \frac{e^{\frac{t^2}{2}}}{1 + t^2},$$
$$y(0) = 4.$$

Problem 2 Consider the differential equation

$$y' - 2y = g(t), \tag{1}$$

where $g = g(t)$ is a 'driving' function to be determined. Assume $y(0) = 1$. Determine a function $g(t)$ defined in the interval $[0, 1]$ so that the solution of (1) is such that $y(1) = -1$.

Problem 3 Find in implicit form the solution of the initial value problem

$$y' = \frac{\sin(x)}{y}, \quad y\left(\frac{\pi}{2}\right) = 1.$$

Determine the interval of existence of the solution and, if possible, give an explicit form .