

## MATH 267 (Sections A3, C-1) Homework No. 2

### Reading

Section 2.4

Section 2.5 (Example 5.1 only)

Section 2.6 (May omit section on 'solution curves and integral curves' and Proof of Theorem 6.14)

### Suggested Problems

Section 2.4: Exercises 1, 5, 7 (Solve with both methods).

Section 2.6: Exercises 1, 3, 9, 11, 27, 29, 35, 37.

### Problems to be handed in by Thursday January 27-th (in class)

**Problem 1** (7 Points) Solve the following initial value problem using the method of the integrating factor

$$x' = 2tx + te^{t^2}, \quad x(0) = 2$$

**Problem 2** (7 Points) Solve the following initial value problem using the method of the variation of parameters

$$x' = -\frac{1}{t}x + t + 1, \quad x(1) = 1.$$

**Problem 3** (6 Points) A linear differential equation of the form

$$x' = ax + f,$$

has a solution given by the function

$$x_p(t) = \sin(t).$$

Moreover a particular solution of the homogenous equation is

$$x_h(t) = e^{-\cos(t)}.$$

Find the solution corresponding to the initial condition  $x(0) = 1$ .

**Problem 4** (10 Points) Solve the following initial value problem by finding an integrating factor and solving the resulting exact differential equation

$$(x^2 - y^2)dx + 2xydy = 0, \quad x(1) = 1$$