

# TMA4165 - Exercise set 1

Unless otherwise stated the exercises below are from:

D.G. Schaeffer & J.W. Cain: Ordinary Differential Equations: Basic and Beyond.

## Exercises for 18-01-2022

### Chapter 1:

1 In part (d) there is no need to consider the physics behind the question. Eq. (1.32) can be derived by simply using eqs. (1.30) & (1.31).

2 Also show that every solution to  $x''(t) + 2x'(t) + x(t) = 0$  is of the form

$$x(t) = C_1 e^{-t} + C_2 t e^{-t}$$

for some constants  $C_1, C_2$ .

*Hint: which equation does  $y(t) = x(t)e^t$  satisfy?*

4

6

13 *Hint for part (a): which equation does  $y(t) = x(t) - x_{partic}(t)$  satisfy?*

### Chapter 2:

1 Only part (a) & (b).