Differential Equations I for Students of Engineering Sciences

Sheet 2 (home)

Exercise 1:

a) Compute a solution to the initial value problem

$$y' + 2y + \sqrt{y} = 0, \quad y(0) = \frac{1}{4}.$$

b) Show that the solution is unique in the interval $[0, \ln 2]$.

c) Show that the solution is not unique in the interval $[0, b]$ for $b > \ln 2$ and give a second solution.

Exercise 2:

Solve the following differential equations

a) Identify the type of the following differential equation und solve it

$$y' - 6y + 3x^2y^2 = -2x^{-3} - 3x^{-2}.$$

   Hint: There exist solutions of the form $y_0(x) = Cx^\alpha$.

b) Solve the following differential equation

$$y'' - 2yy' = 0.$$

Hand in until: 12.11.2021