Fachbereich Mathematik der Universität Hamburg **Winter 2021/22**
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Differential Equations I for Students of Engineering Sciences

Sheet 5 (home)

Exercise 1:

Consider the differential equation

$$y'' + y' - 6y = 6x^2 - 20x + 7\,.$$

a) Compute the general solution by means of a special ansatz for the inhomogeneity.

b) Rewrite the differential equation as a system of first order and compute the general solution of the system by variation of constants.

Exercise 2:

Solve the initial value problem

$$y'' + y' - 20y = (36x - 23)e^{4x} \quad \text{with} \quad y(0) = 3\,, \quad y'(0) = 0$$

by means of

a) the characteristic polynomial as well as a special ansatz for the inhomogeneity and

b) the Laplace Transformation.

Hand in until: 7.1.2022