RWTH Aachen University
Chair of Process Control Engineering

Exercise 3

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Kurs: *Process Measurement* – Professor: *Prof Dr. Kleinert*

Task 1. (Strain Gauges)

a) Describe the working principle of a strain gauge.

b) Deduce the linear correlation between resistance and length variation.

c) The figure depicts the circuit diagram of a full bridge circuit. Specify the linearized equation that describes the correlation between measured voltage U_m, feeding voltage U_s and the resistors R_i $(i = 1, \ldots, 4)$.

d) For the purpose of this task, assume that the depicted full bridge circuit is attached to a carrier for bending measurements. Determine the impact of temperature changes within the resistors on the measured voltage U_m.

Lösung.

Task 2. (Capacitive Displacement Measurement)

The structural setup of a capacitive displacement measurement, which includes three capacitor plates, is depicted in the figure below. Specify the formula for the determination of x. Assume that the capacity is given.

Lösung.