# Course „Control Systems 2“

Exercise Sheet 6

**Task 17:**

Consider the LTI SISO system

$$\dot{\underline{x}} = \begin{bmatrix} -1 & 5 \\ 7 & -3 \end{bmatrix} \underline{x} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u$$
$$y = \begin{bmatrix} 0 & 1 \end{bmatrix} \underline{x}$$

a) Is the system asymptotically stable? Why (not)?

b) Determine the solution $\underline{x}(t)$ and $y(t)$ for $t \geq 0$ assuming the initial state $x_0 = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$ and the step-like input signal $u(t) = s(t - 2\text{sec})$.

Hint: Use the results from the Tasks 10b), 11 and 12 (see Exercise Sheet 3).