Course „Control Systems 2“

Exercise Sheet 10

Task 24:

Consider the first-order system with the state equations

$$\dot{x} = -10x + u$$
$$y = 2x$$

Determine the gain k of the output feedback controller

$$u = -k \cdot y$$

which minimizes the objective function

$$J = \frac{1}{2}\int_0^\infty 11 \cdot y^2(t) + u^2(t)\, dt$$

for arbitrary initial conditions $x_0 = x(t)$. Is the solution unique?