## Additional Exercises:

1. Given:

$$5 \cdot \frac{dx_1}{dt} = -x_1 + 2 \cdot u$$

$$2 \cdot \frac{dx_2}{dt} = -x_2 + u$$

where the controlled variable y is given by: $y = x_1 - x_2$

Obtain the range of proportional gain that will yield a stable feedback system. (You can assume the bias term $u_o$=0.

2. Given an open-loop unstable process described by:

$$-10 \cdot \frac{dx}{dt} + x = \frac{1}{5} \cdot u$$

Obtain a PI controller to stabilize the controlled output x, such that the decay ratio is 1/4, and the period of oscillation is 10.