

Control Systems Course, Ing. Alessandro D’Innocenzo

Academic Year 2011-2012

Homework, October 28th 2011

- HW1** Given a plant characterized by the transfer function $G(s) = \frac{1}{s+10}$, design a control scheme and a controller $G_c(s)$ such that the closed loop system is of type 1. Using the designed controller, compute the impulse and step response of the closed loop system.
- HW2** Given a plant characterized by the transfer function $G(s) = \frac{s+1}{(s+2)(s+10)}$, design a control scheme and a controller $G_c(s)$ such that the steady state error of the closed loop system with respect to a ramp input is smaller than 1. Using the designed controller, check whether the settling time T_s is smaller than 4 s.
- HW3** Given a plant characterized by the transfer function $G(s) = \frac{1}{s(s+1)}$, design a control scheme and a controller $G_c(s)$ such that the closed loop system is astatic¹ with respect to a step additive disturbance applied to the input of the plant $G(s)$.

¹A system is astatic with respect to a given disturbance if the steady state output of the system with respect to the disturbance is equal to zero.