

Name and surname:

Control Systems

Test # 1 – January 11, 2011

1. Given the system described by the transfer function

$$G(s) = \frac{2}{s - 4}$$

having a step disturbance acting on its input, determine a feedback control scheme and a PI controller of the form

$$G_c(s) = k_P + \frac{k_I}{s}$$

such that

- a) the effects of the disturbance is zero in steady-state;
- b) the system is capable to reproduce linear ramps with a maximum error of 0.8;
- c) the time instant after which the transient can be considered zero has to be less or equal to 6 s;
- d) calculate the step response of the feedback system.

[10 points]

2. Given the system

$$G(s) = \frac{1}{s(s - 10)}$$

determine a feedback scheme and a controller $G_c(s)$ such that

- a) The feedback system is at least of type-2 with respect to the reference;
- b) The steady-state error is such that $|e_2| \leq 0.2$;

What happens if there is a disturbance acting on the system output?

[10 points]

3. Illustrate the Routh's criterion (maximum 2 pages).

[10 points]