İstanbul Bilgi University
Faculty of Engineering and Natural Sciences
Department of Elecetrical and Electronics Engineering

Course: EEEN 352 System Dynamics and Control
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Exam/Date: Quiz 03/07.05.2020, 12:00
Duration: 45 min.

EEEN 352 Quiz 03

Problem 1) (**50 points**) For the feedback control system given in Figure P1,

- **(a)** What is the type of the system? (You need to convert the system to a simple unity feedback.)
- **(b)** Find the steady-state error for an input step of $1.5u(t)$ for $K = 22$
- **(c)** Find the steady-state error for an input ramp of $1.5tu(t)$ for the same gain, $K = 22$.

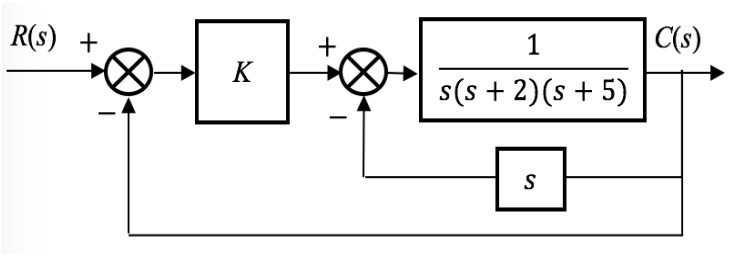

Figure P1

Problem 2) (**50 points**) Consider the characteristic equation of a unity feedback control system whose open-loop transfer function is given by

$$G(s) = \frac{K(s+2)}{s(s-1)}$$

- **a.** Determine the range of values for the gain K using Routh-Hurwitz method.
- **b.** Sketch the root-locus by applying all appropriate steps of root-locus.