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Department of Computer and Electrical Engineering
ELNG 305: Classical Control Systems - Quiz 1
Duration: 55 minutes

1. State one(1) advantage and disadvantage each of closed-loop systems over open-loop systems.
2. Using the definition of Laplace Transforms, find the Laplace Transform , $F(s)$ of the signal, $f(t) = 3\cos(2t)\sin(3t)u(t)$.
3. State the initial and final value theorems.
4. Define peak overshoot in the response of a system.
5. A negative unity feedback control system has the open loop transfer function

$$G(s) = \frac{10(s+10)}{s(s+5)}$$

Find the unit step response of the system.

6. The dynamic behaviour of system is governed by the following equations

$$\frac{d^3p(t)}{dt^3} + 2\frac{d^2p(t)}{dt^2} + kp(t) = v(t)$$

$$\frac{dv(t)}{dt} + v(t) = u(t)$$

$$4p(t) = y(t)$$

where $y(t)$ is the output variable, $u(t)$ is the input variable, and k is an adjustable parameter. Derive the transfer function, $\frac{Y(s)}{U(s)}$ of the system.

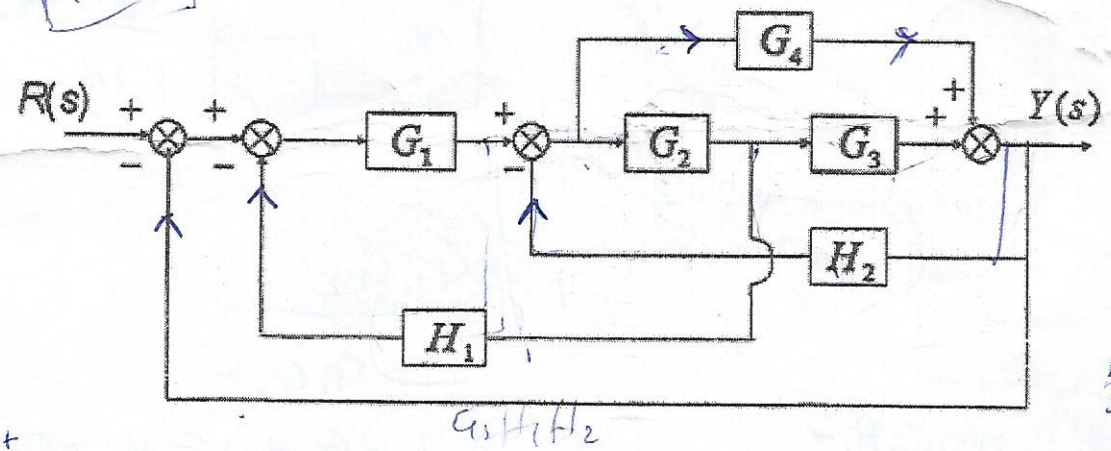

Figure 1: Block diagram for Question 6

7. Reduce the block diagram in Figure 1, and determine the transfer function $Y(s)/R(s)$

OR

8. Convert the block diagram in Figure 2 to signal flow and find the transfer function $Y(s)/R(s)$ using the Mason's gain formula.