

Control Engineering II

Topic 4: Discretization of Continuous-Time Systems

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Problems

Problem 1

Obtain $G(z)$ as the sum of residues for the following transfer function:

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

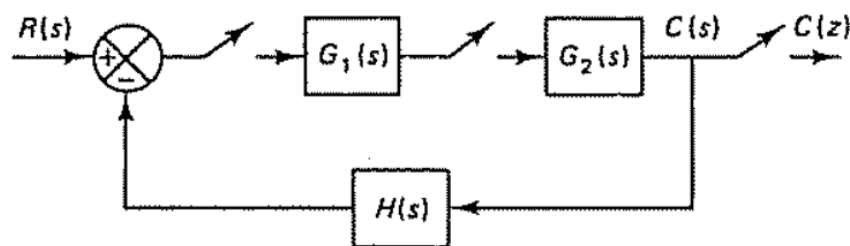
Problem 2

Obtain the Z-transform of the following function by partial fraction expansion and using the residue method:

$$X(s) = \frac{s}{(s+1)^2(s+2)}$$

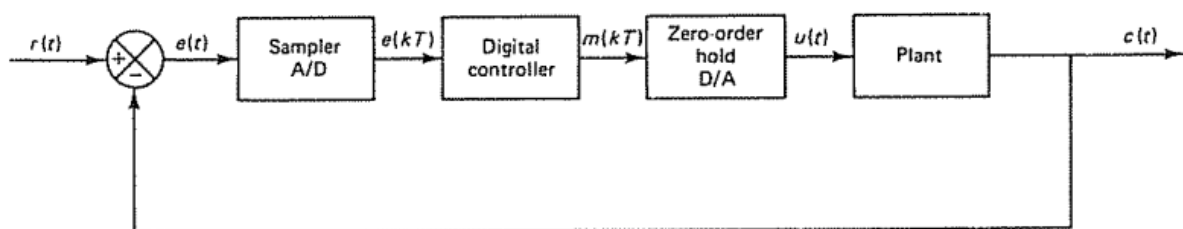
Problem 3

Obtain the equivalent transfer function of the following system:



Problem 4

Calculate the equivalent transfer function of the digital control system represented in the following figure:



Problem 5

Approximate the transfer function in z for the following function using the Euler I, Euler II and Trapezoidal methods:

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