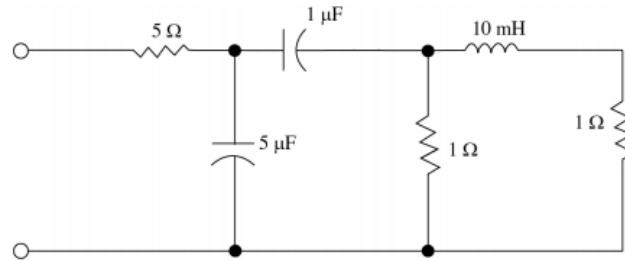
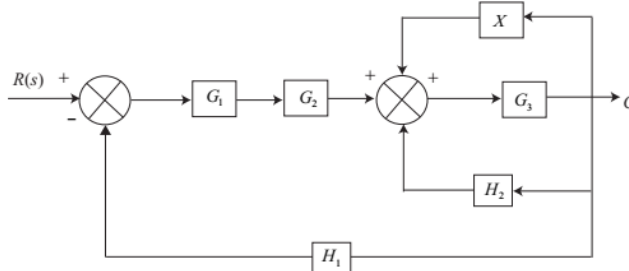


- 1) The system matrix of a discrete system is given by A . Find the characteristic equation.
- 2) A particular control system is described by the following state equations: $\dot{X} =$ and $y =$. Find out the transfer function of the system.
- 3) Consider the single-input, single-output system with its state variable representation: $\dot{X} =$ and $y =$. Comment on controllability and observability.
- 4) The state equation of a linear system is given by $\dot{X} = Ax + Bu$, where $A =$, $B =$. Find out the state transition matrix.
- 5) The minimum number of states necessary to describe the network shown in the Figure in a state variable form is

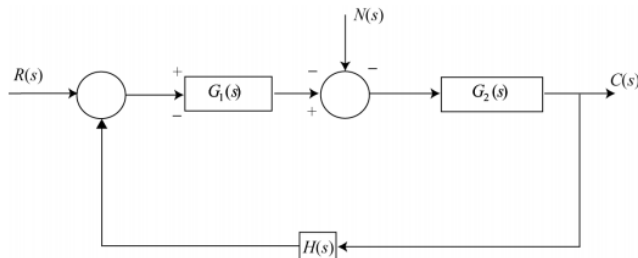


- 6) A system is described by the state equation $\dot{X} =$ and $y =$. Find the transfer function of the system.
- 7) A state variable system $\dot{X} =$, with initial condition $X(0) = [-1 \ 3]^T$ and the unit step input $u(t)$. Find out the state transition matrix.
- 8) A system block diagram is shown in Figure

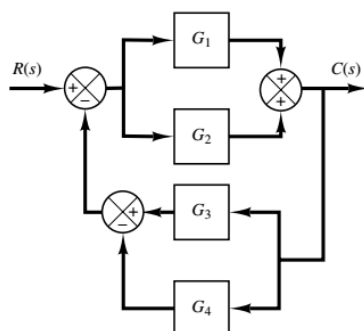


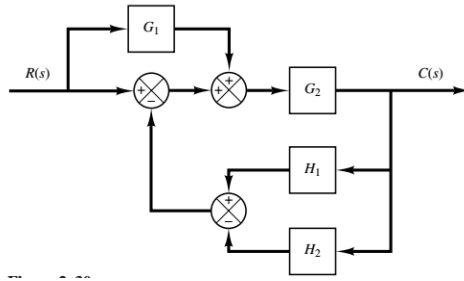
The overall transfer function of the system is $\frac{C(s)}{R(s)} =$. Find the value of X .

- 9) Find out the transfer function $C(s)/N(s)$.

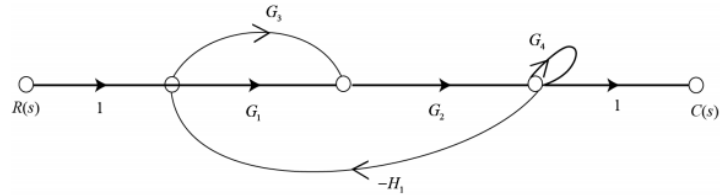


- 10) Simplify the block diagrams





11) Find the gain $C(s)/R(s)$ of the signal flow graph shown in the figure.



12) Draw the signal flow graph from the block diagram. Find the transfer function using Mason's gain formula.

