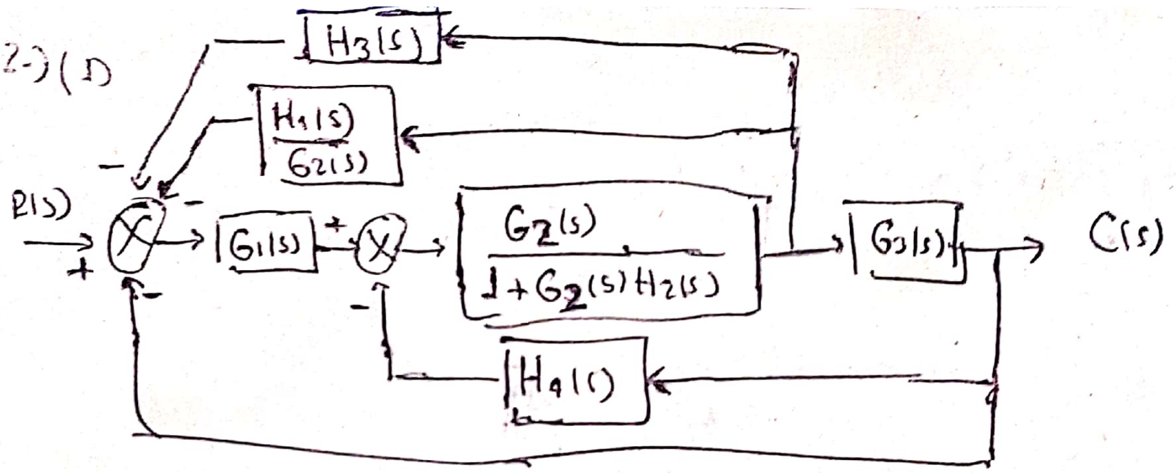
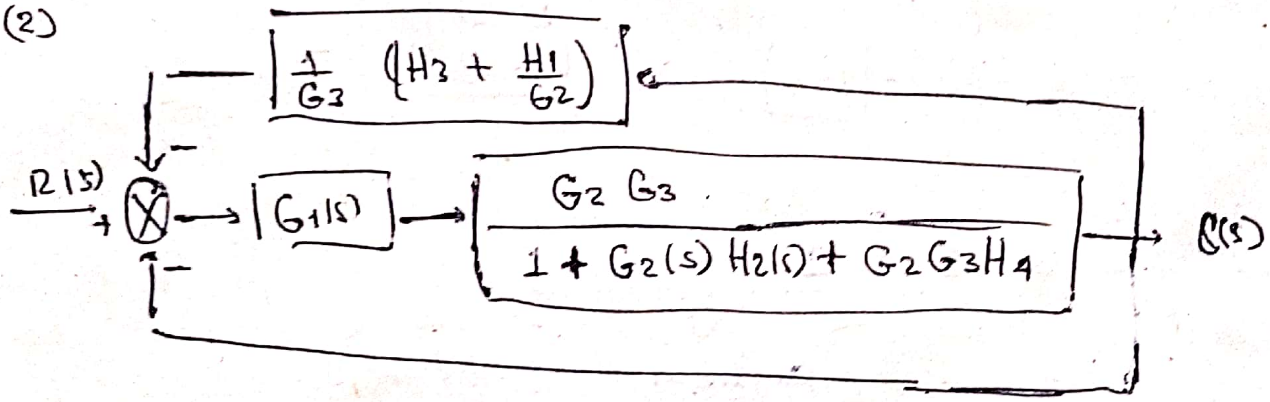
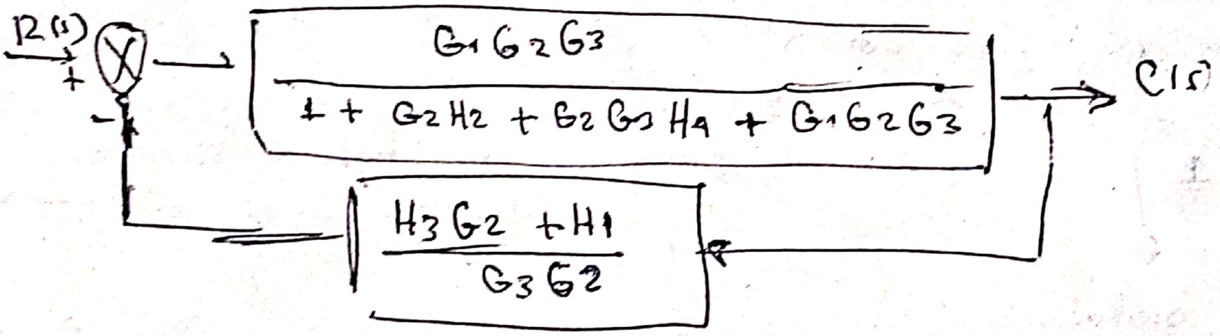
2-) (1)



(2)



(3)



$$H(s) = \frac{G_1 \cancel{G_2} \cancel{G_3}}{(1 + G_2H_2 + G_2G_3H_4 + G_1G_2G_3)\,G_3G_2 + G_1\cancel{G_2}\cancel{G_3}(H_3G_2 + H_1)}$$

$$\boxed{H(s) = \frac{G_1G_2G_3}{1 + G_2(H_2 + G_3H_4 + G_1G_3 + G_1H_3) + G_1H_1}}$$

3)
$$H(s) = \frac{3K}{s^4 + s^3 + 2s^2 + s + 3K}$$

s^4	1	2	3K
s^3	1	1	0
s^2	A	B	0
s^1	C	0	0
s^0	3K	0	0

$$A = -\frac{\begin{vmatrix} 1 & 2 \\ 1 & 1 \end{vmatrix}}{1} = -(1-2) = \boxed{1 = A}, \quad B = -\frac{\begin{vmatrix} 1 & 3K \\ 1 & 0 \end{vmatrix}}{1} = 3K$$

$$C = -\frac{\begin{vmatrix} 1 & 1 \\ 1 & 3K \end{vmatrix}}{1} = -(3K-1) = \boxed{1 - 3K = C}$$

analizar

a-) Para que sea marginalmente estable fila de ceros se analiza la fila de s^1 a s^0.

$1 - 3K = 0$ $\wedge$ $3K = 0$

$\boxed{K = \frac{1}{3}}$ $K = 0 \Rightarrow$ no habría salida

No sirve la solución

Genera oscilaciones

b-) Estable, garantizar que no ocurra cambio de signo.

$1 - 3K > 0$

$1 > 3K$

$K < 1/3$

$3K > 0$

$K > 0$

$\boxed{0 < K < \frac{1}{3}} \Rightarrow$ Estable

c-) Se escoge $K = 1/5$. Sistema tipo 1.

a para $r(t) = 5u(t)$

$\boxed{e_{ss} = 0}$

por que el sistema tiene un integrador

b para $r(t) = -4tu(t)$

$$e_{ss} = \frac{-A}{K_V} = -\frac{4 \cdot 5}{3} = \boxed{\frac{-20}{3} = e_{ss}}$$

$$K_V = \lim_{s \to 0} s \frac{3/5}{s^4 + s^3 + 2s^2 + s} = \frac{3}{5}$$