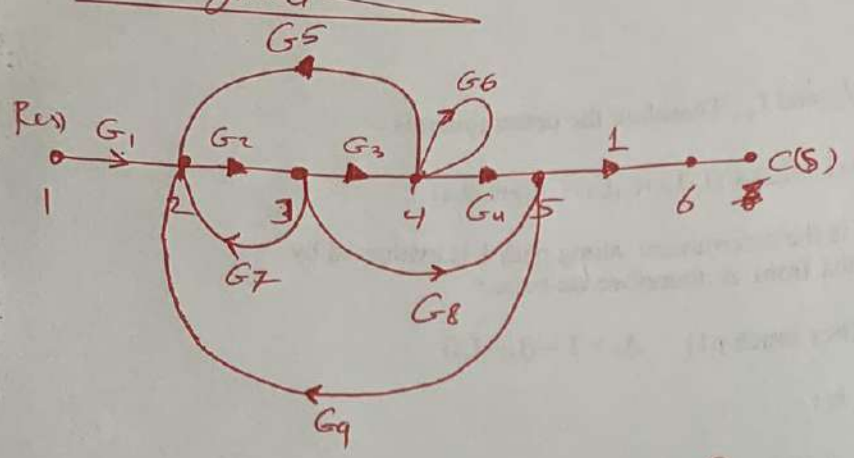
Assingment



⟹ we have 2 forward paths;

$P_1 = G_1 G_2 G_3 G_4$

$P_2 = G_1 G_2 G_8$

for P_1 There is no non-touching loop forward path

$\therefore \Delta_1 = 1$

for P_2 There is one non-touching loop for forward path

$\Delta_2 = 1 - G_6$

The Total # of Loops = 5 and they are

$L_1 = G_2 G_7$

$L_2 = G_2 G_3 G_5$

$L_3 = G_6$

$L_4 = G_2 G_3 G_4 G_9$

$L_5 = G_2 G_8 G_9$

⟹ There are 2 non-touching loop

$L_1 L_3 = G_2 G_7 G_6$

$$\Delta = 1 - (L_1 + L_2 + L_3 + L_4 + L_5) + L_1 L_3$$

$$= 1 - (G_2 G_7 + G_2 G_3 G_5 + G_6 + G_2 G_3 G_4 G_9 + G_2 G_8 G_9) + G_2 G_7 G_6$$

∴ Masons Gain formula,

$$T.F = \frac{C}{R} = \frac{P_1 \Delta_1 + P_2 \Delta_2}{\Delta} = \frac{\sum_k P_k \Delta_k}{\Delta}$$

$$= \frac{G_1 G_2 G_3 G_4 + G_1 G_2 G_8 (1 - G_6)}{1 - (G_2 G_7 + G_2 G_3 G_5 + G_6 + G_2 G_3 G_4 G_9 + G_2 G_8 G_9) + G_2 G_7 G_6}$$