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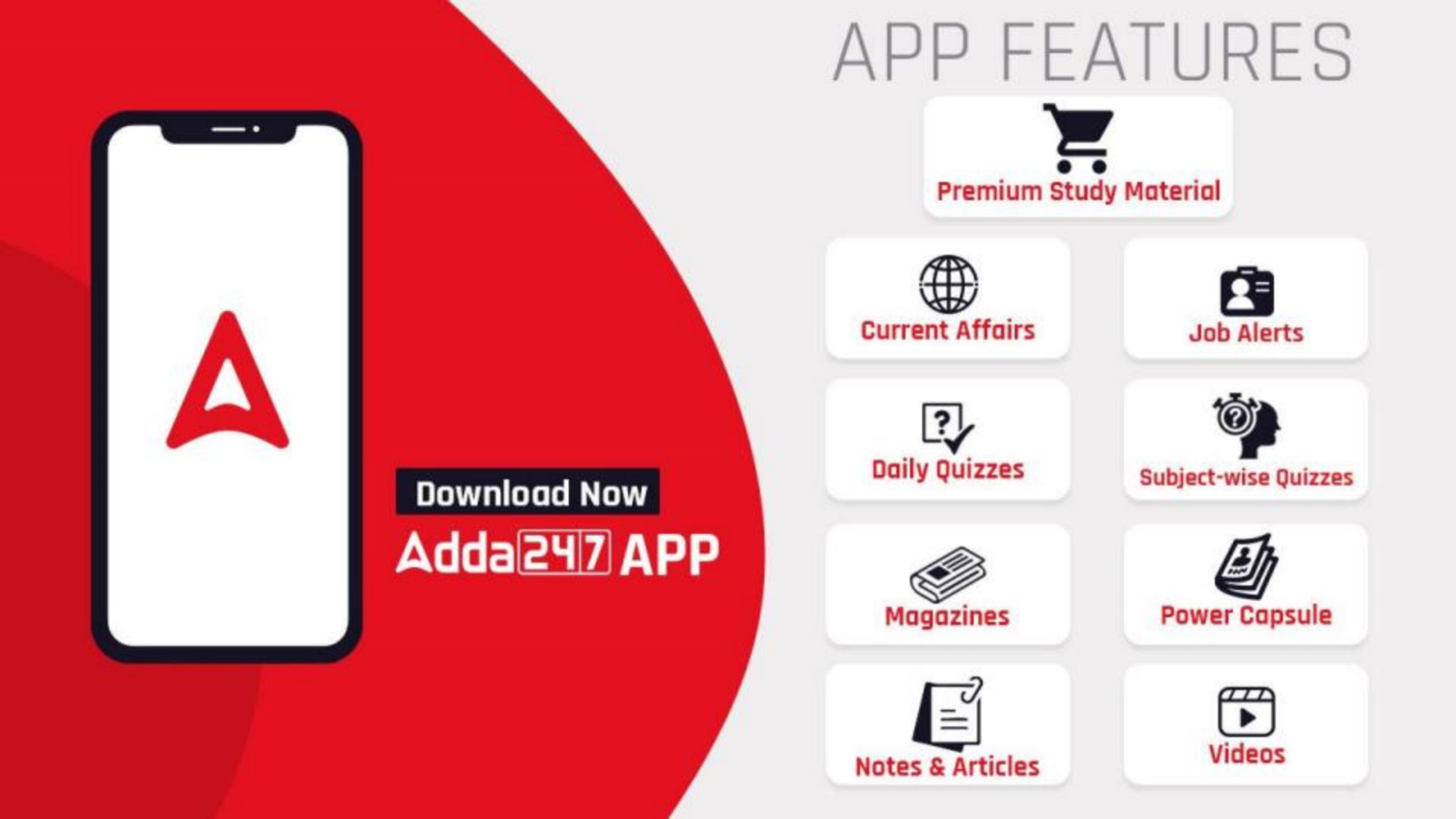
TO Adda247

Belief creates the actual fact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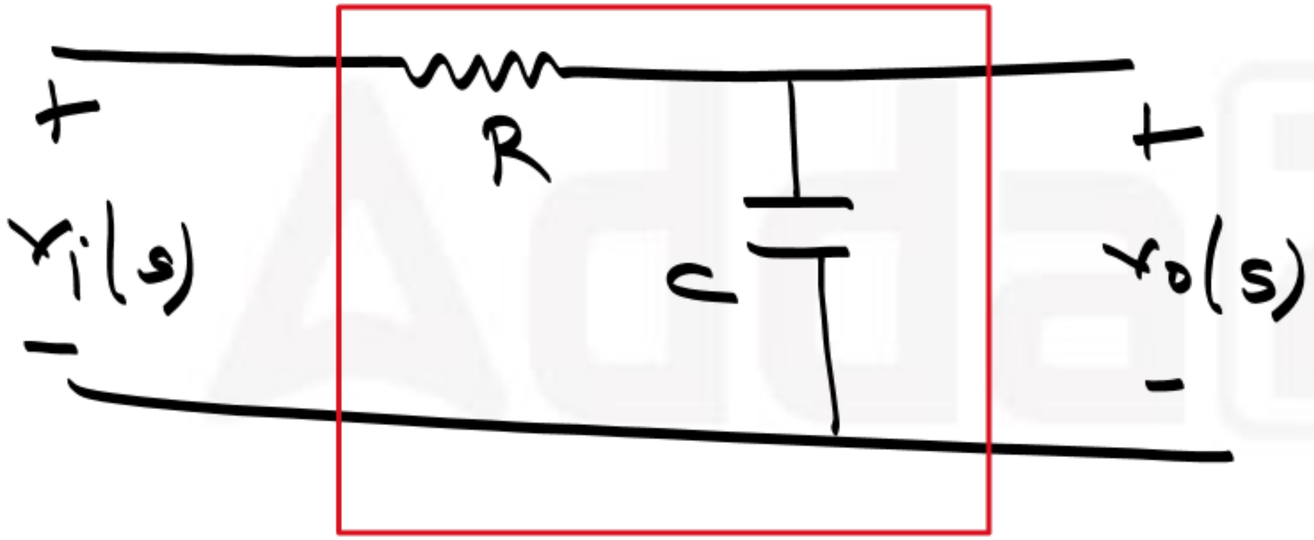
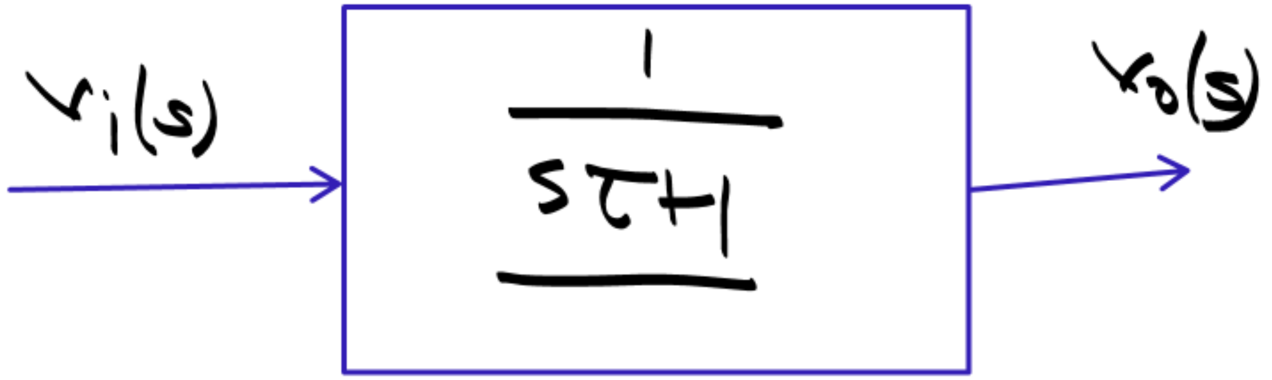
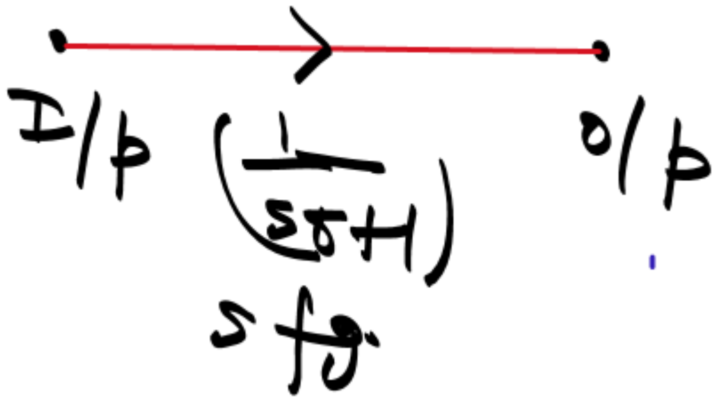


$$\frac{V_o(s)}{V_i(s)} = \frac{1}{s\tau+1}$$

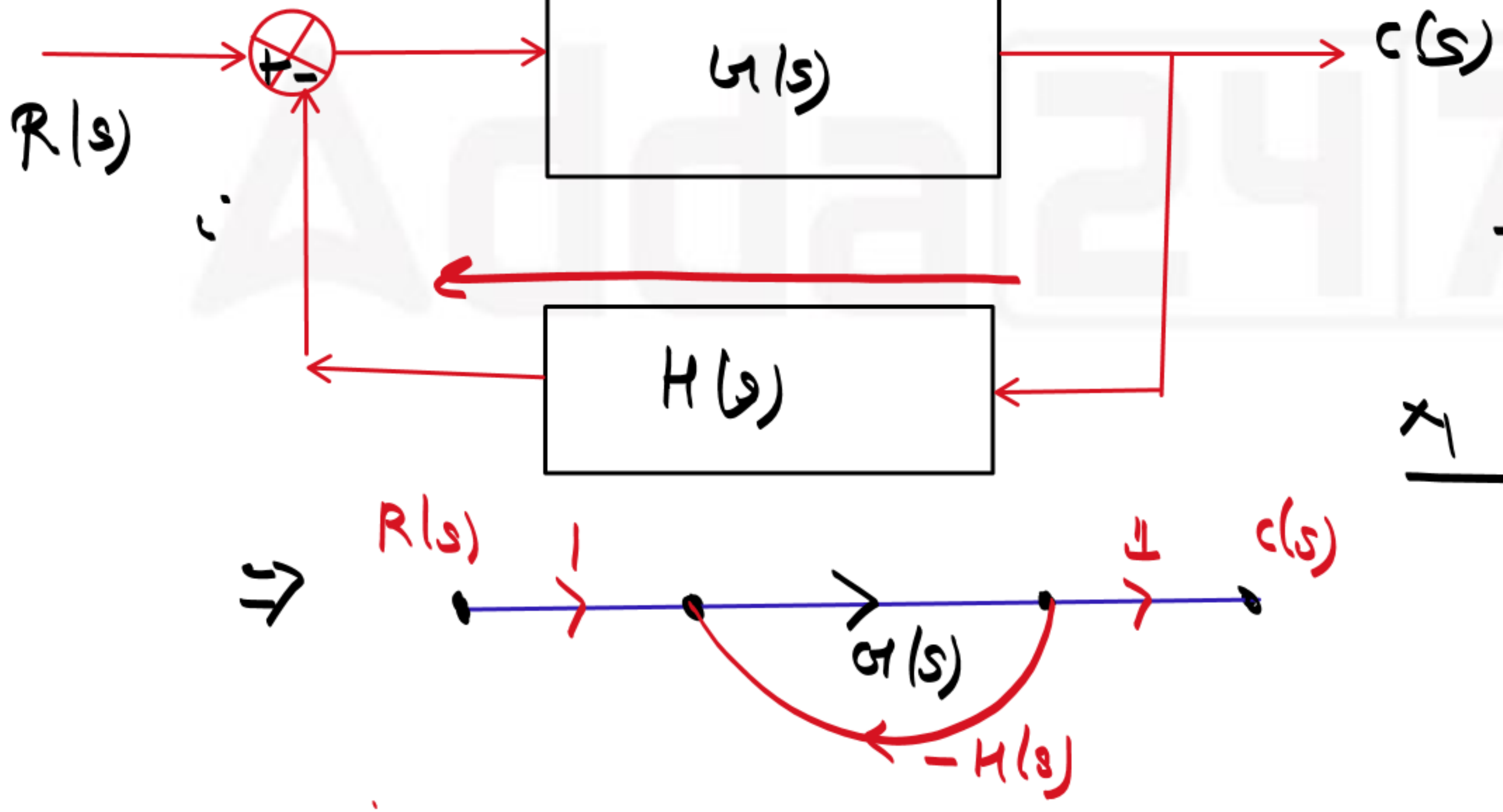
$\tau = RC$



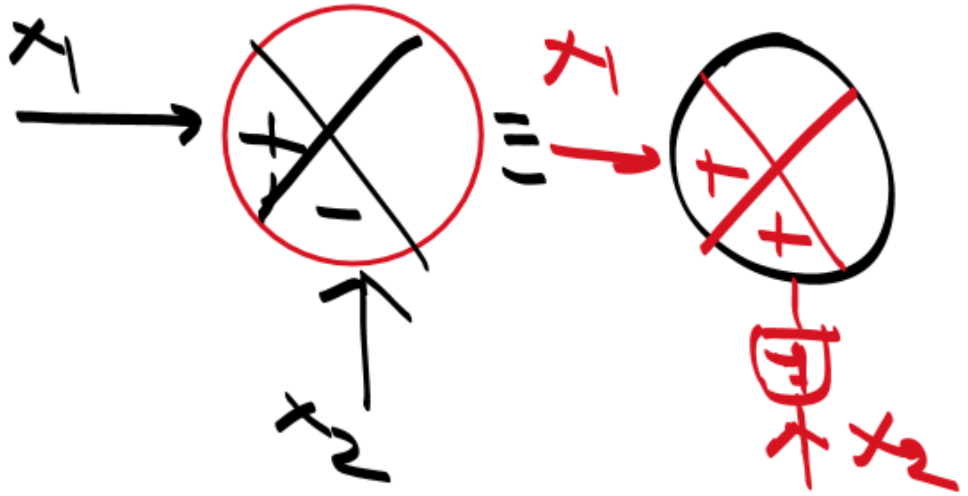
⇐



SFG :→



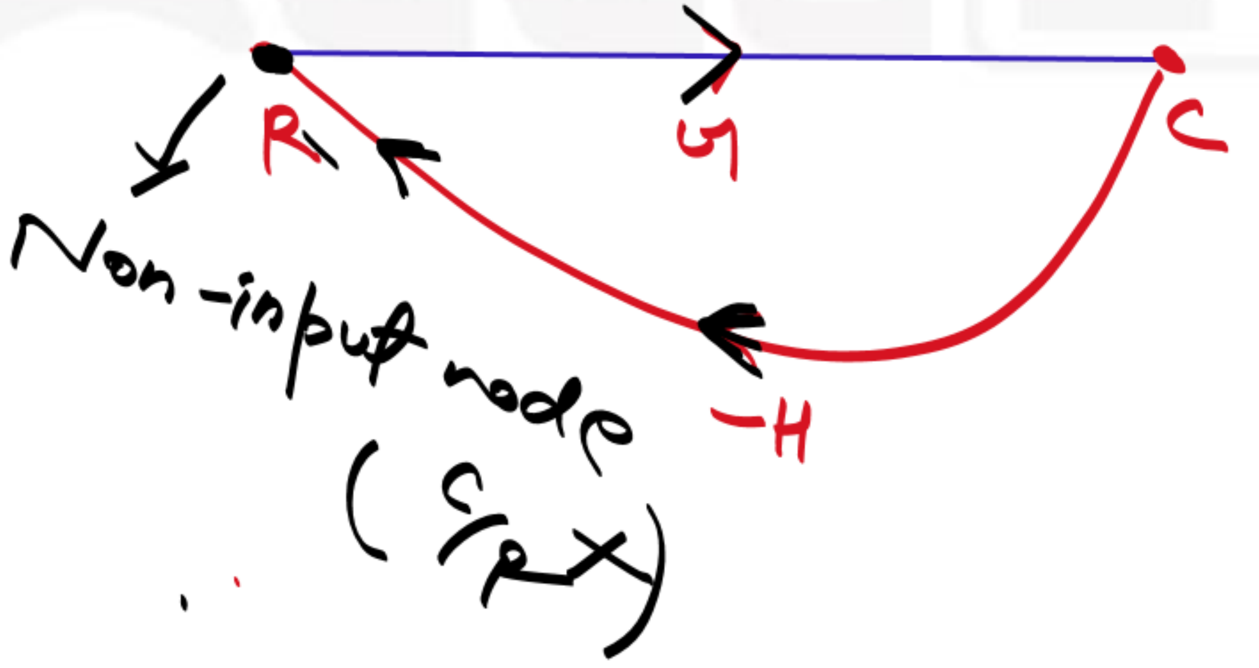
$$\frac{C(s)}{R(s)} = \frac{G(s)}{1+G(s)H(s)}$$



Mason's gain formula

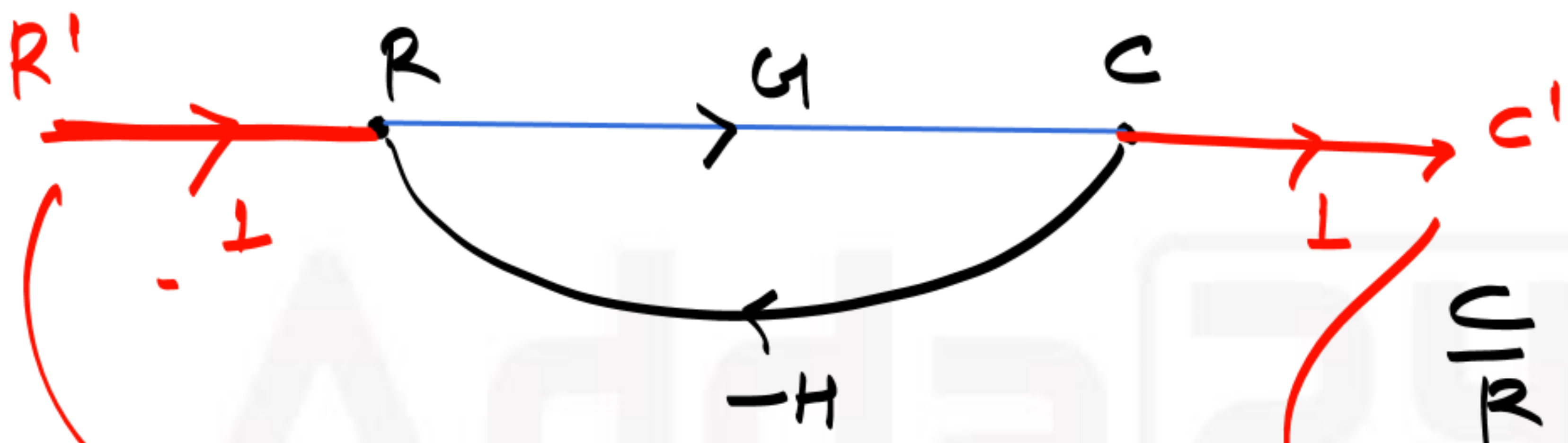
$$\frac{C}{R} = \frac{\text{output node}}{(\text{Input node})}$$

← from where only outgoing line emerges.



$\frac{C}{R} = ?$ by using ~~mason's gain~~ formulae?

×



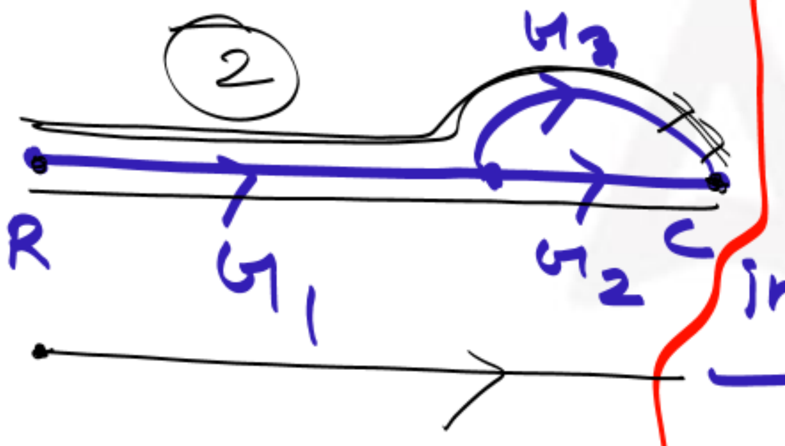
$$\frac{C}{R} = \frac{\text{o/p node}}{\text{i/p node}}$$

Input node

C' → output node

$\frac{C'}{R'} = ?$ → ✓ mason's gain formula ✓

Mason's gain formula



$$TF \Rightarrow \frac{C}{R} = \frac{\sum_{K=1}^{n} P_K \Delta_K}{\Delta}$$

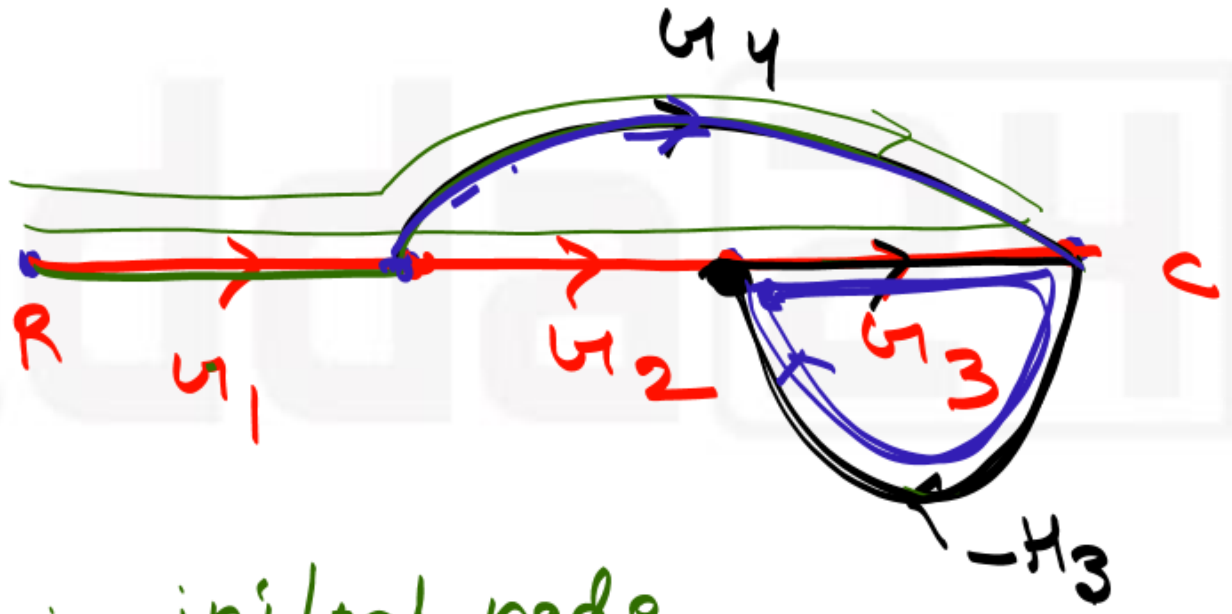
input node

$$= \frac{P_1\Delta_1 + P_2\Delta_2 + \cdots}{\Delta}$$

n = no. of forward path → connects i/p node to o/p node.

P_K → gain of kth forward path.

$$\frac{C}{R} = \frac{\sum_{k=1}^{n} P_k \Delta_k}{\Delta} = \frac{P_1\Delta_1 + P_2\Delta_2}{\Delta}$$



no. of forward path = 2

$P_1 \rightarrow G_1 G_2 G_3$

$P_2 = G_1 G_4$

loop :→ initial node and final node same

$$\frac{C}{R} = \frac{\sum_{k=1}^{n} P_k \Delta_k}{\Delta}$$

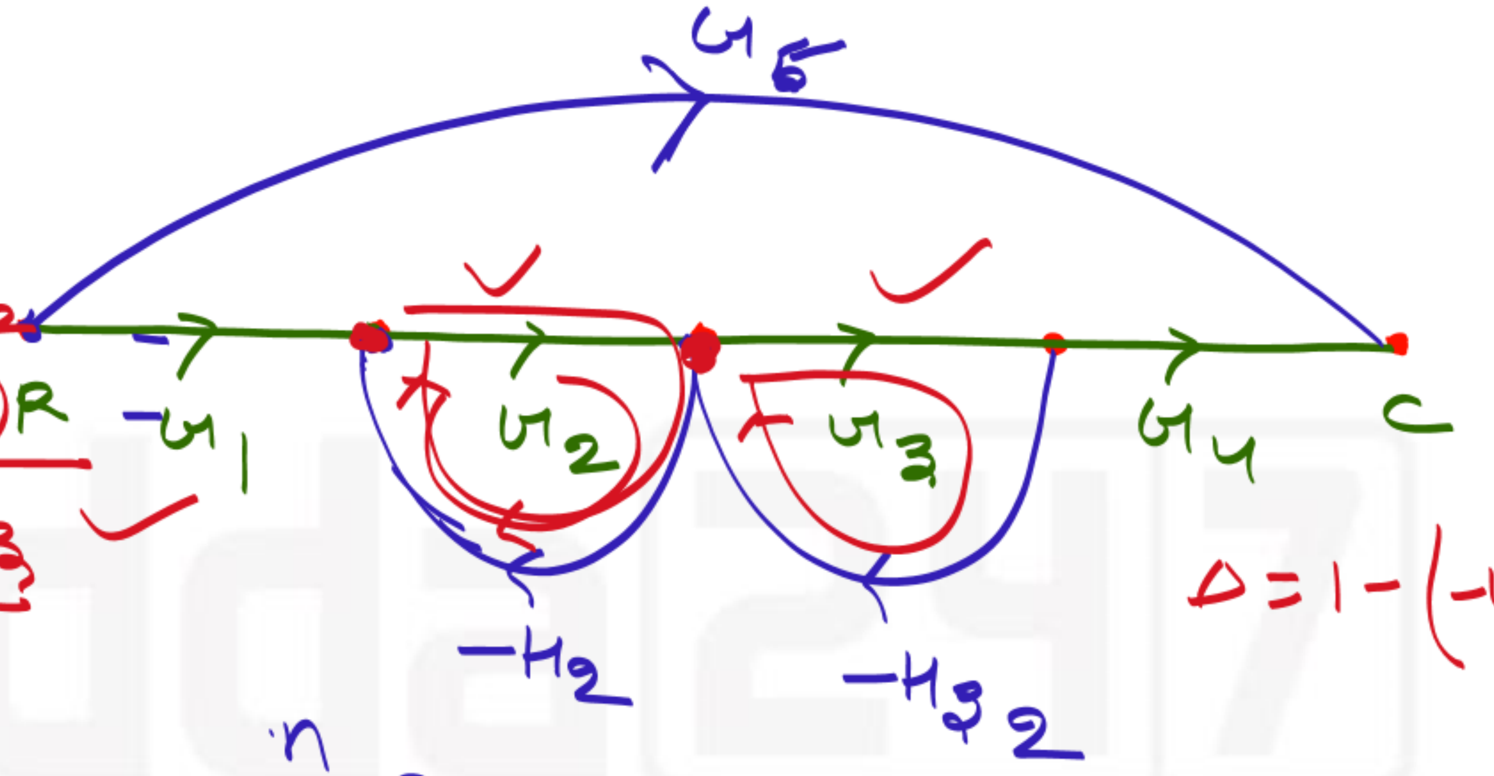
Δ = 1 − (sum of all loop gains)

+ (sum of product of two non-touching loop gains)

− (sum of product of 3 non-touching loops) + - -

non-touching → not any node must be in common.

Δ_k → Δ excluding loop touching kth path eg :→



$$\frac{C}{R} = \frac{G_1G_2G_3G_4 + G_5(1+G_2H_2+G_3H_3)}{1+G_2H_2+G_3H_3}$$

$$\Delta = 1 - (-G_2H_2 - G_3H_3) + \ldots = 1 + G_2H_2 + G_3H_3$$

$$\frac{C}{R} = \frac{\sum_{k=1}^{n} P_K \Delta_K}{\Delta} = \frac{\sum_{K=1} P_K \Delta_K}{\Delta} = \frac{P_1\Delta_1 + P_2\Delta_2}{\Delta}$$

$P_1 = G_1G_2G_3G_4$ $\Delta_1 = 1 - (0) = 1$

$P_2 = G_5$

$$\Delta_2 = 1 - (-G_2H_2 - G_3H_3) = 1 + G_2H_2 + G_3H_3$$

THANKS FOR

Watching

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