



Faculty of Engineering  
Department of Electrical & Computer Engineering

Control Systems (ECE 331)

Signal Flow Graph (SFG) - II

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# Signal Flow Graph (SFG) :

## Example:01

Step:1 → Forward Path Gain  $P_1 = G(s)$

Step:2 → Single Loop Gain  $P_{11} = -G(s)H(s)$

Step:3 → Two Non Touching Loop Gain : Not Available

Step:4 → Three Non Touching Loop Gain: NA

Step:5 → Find  $\Delta$

$$\Delta = 1 - (P_{11}) + (P_{12}) - (P_{13}) + \dots = 1 - (-G(s)H(s)) = 1 + G(s)H(s)$$

Step:6 → Find  $\Delta_1$  (Only  $\Delta_1$  is to be find out as there is only one forward path available)

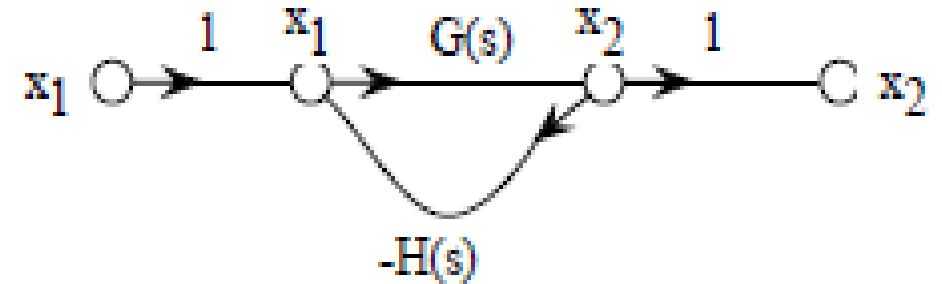
$\Delta_1 =$  The value of  $\Delta$  for the part of graph non touching to the  $i^{\text{th}}$  Forward Path = 1

Step:7 → Find

$$\text{Transfer Function} = \frac{C(s)}{R(s)} = \frac{1}{\Delta} \sum P_i \Delta_i$$

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

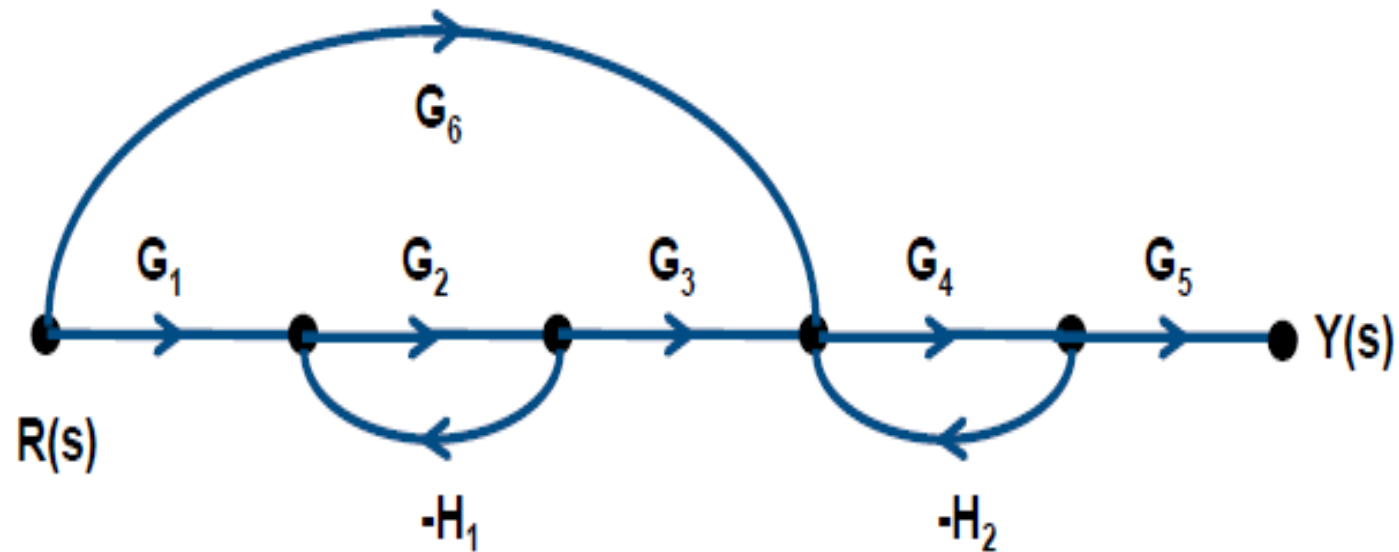
$$\frac{G(s)}{1 + G(s)H(s)}$$



# Signal Flow Graph (SFG) :

## Example:02

Find the transfer function for the following figure.

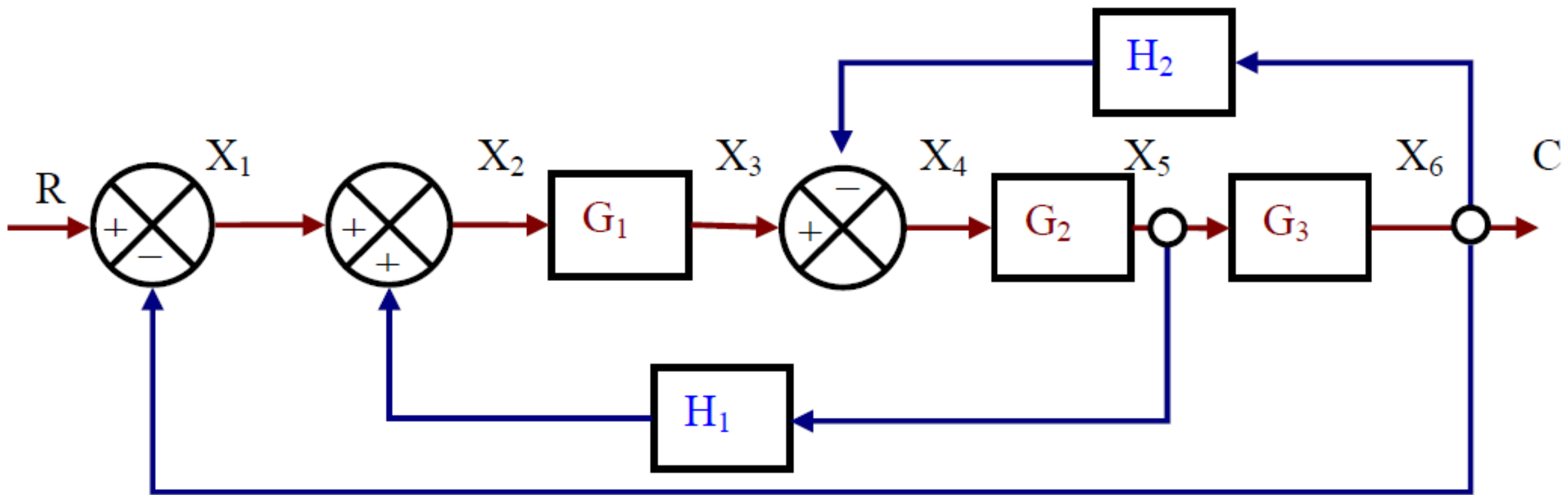


$$\text{Transfer Function} = \frac{G_1 G_2 G_3 G_4 G_5 + G_6 G_4 G_5 (1 + G_2 H_1)}{1 + G_2 H_1 + G_4 H_2 + G_2 H_1 G_4 H_2}$$

# Signal Flow Graph (SFG) :

## Example:03

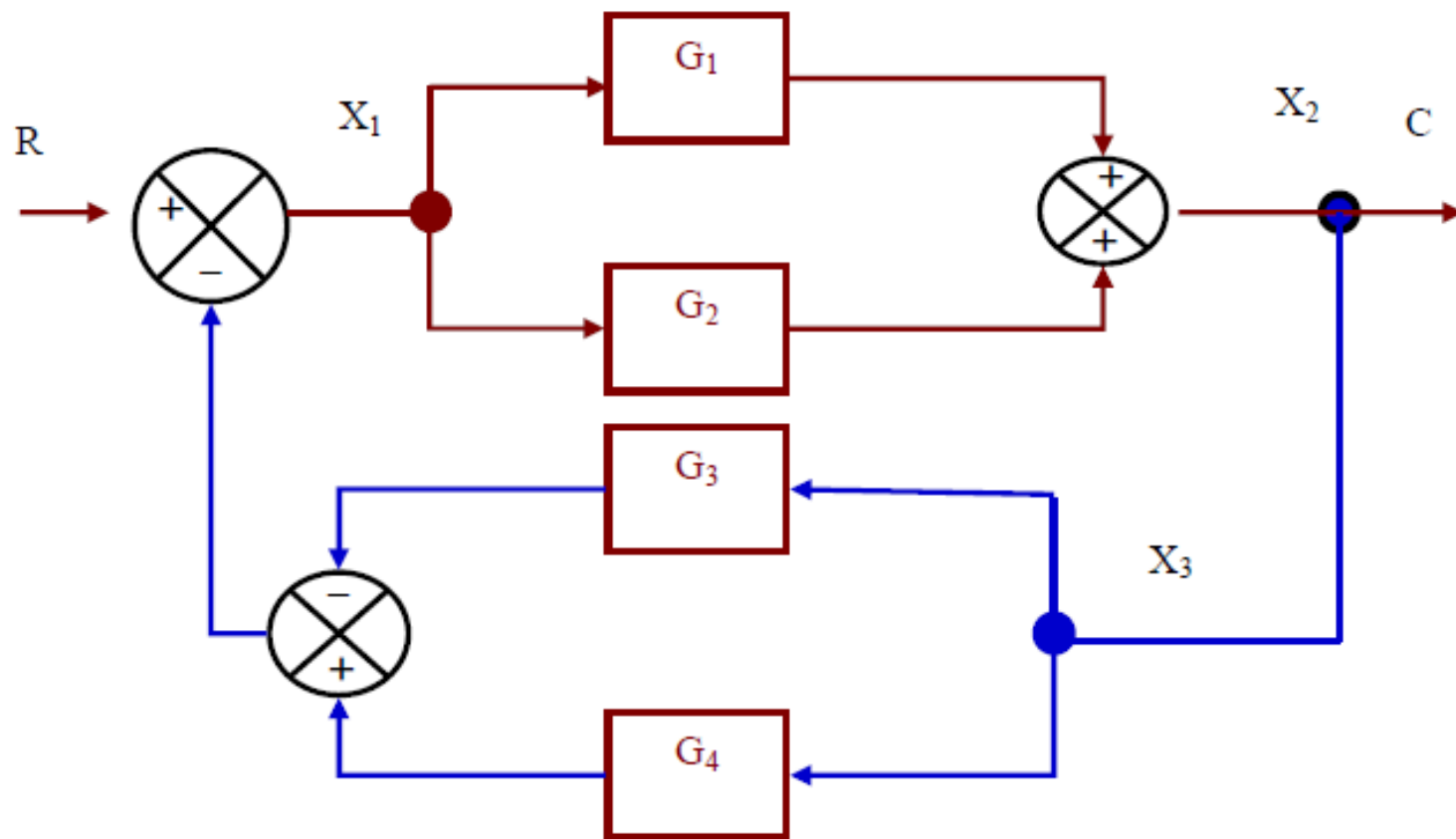
Find the transfer function for the following figure.



# Signal Flow Graph (SFG) :

## Example:04

Find the transfer function for the following figure.



Thank You !