



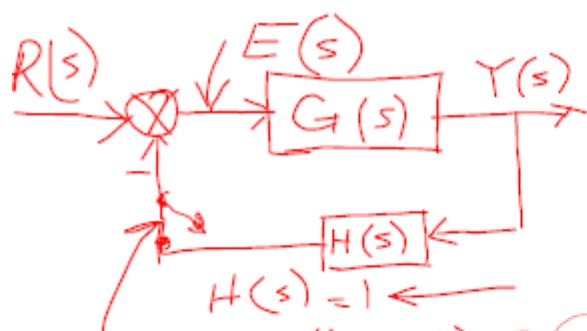
Mon.

28/10/2024

المحاضرة موجودة في ملف التقنية الوسطى من ص 23 الى ص 32

Blocks connection

- 1- Cascaded $G_{eq} = G_1 \times G_2 \times G_3$
- 2- Parallel $G_{eq} = G_1 + G_2 + G_3$
- 3- Feed back $G_{eq} = G(\text{forward path}) / [1 + G(\text{forward path}) \times H(\text{feedback path})]$



$$B(s) = Y(s) \times H(s) \quad \text{--- (1)}$$

$$E(s) = R(s) - B(s) \quad \text{--- (2)}$$

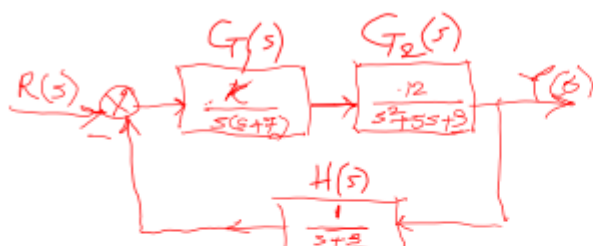
$$Y(s) = E(s) \cdot G(s) \Rightarrow Y(s) = [R(s) - B(s)] G(s)$$

$$Y(s) = [R(s) - Y(s) \times H(s)] G(s)$$
$$= R(s) \cdot G(s) - \underbrace{Y(s) \times H(s) \times G(s)}$$

$$Y(s) + Y(s) H(s) G(s) = R(s) \cdot G(s)$$

$$Y(s) [1 + H(s) G(s)] = R(s) G(s)$$

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



Find $Y(s)/R(s)$?

$$\frac{Y(s)}{R(s)} = \frac{G_1 G_2}{1 + G_1 G_2 H}$$

$$\begin{aligned} &= \frac{\frac{K}{s(s+7)} \cdot \frac{12}{s^2+5s+3}}{1 + \frac{12K}{s(s+7)(s+3)(s^2+5s+3)}} \\ &= \frac{\frac{12K}{s(s+7)(s^2+5s+3)}}{\frac{s(s+7)(s+3)(s^2+5s+3) + 12K}{s(s+7)(s+3)(s^2+5s+3)}} \end{aligned}$$

$$\frac{Y(s)}{R(s)} = \frac{12K(s+3)}{s(s+7)(s+3)(s^2+5s+3) + 12K}$$