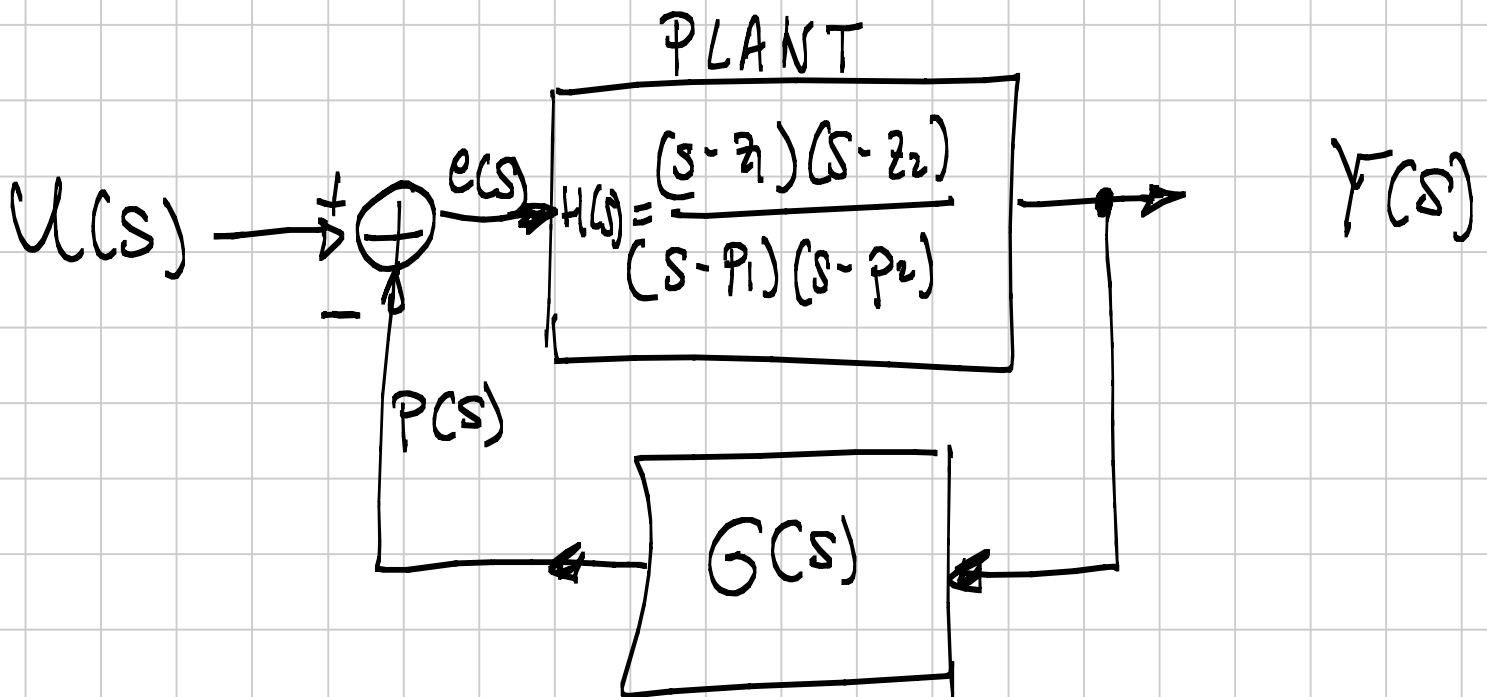


- Clase 1: hoy 31 marzo
- Clase 2: 9 de abril
- Clase 3: 14 de abril
- Clase 4: 16 de abril.
- Les evaluaré con Quizzes!!



Su	Mo	Tu	We	Th	Fr	Sa
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	1	2	3
4	5	6	7	8	9	10

- El objetivo de un controlador electrico es arreglar algo que no funciona o funciona mal.



Si no hay controlador  $P(s) = 0 \Rightarrow e(s) = U(s)$

$$Y(s) = H(s) U(s) = \frac{\dots}{(s-p_1)(s-p_2)} U(s)$$

↑ polos del sistema

Si hay controlador:

$$Y(s) = H(s) e(s) \quad \text{pero} \quad e(s) = U(s) - P(s)$$

$$P(s) = G(s) Y(s)$$

$$Y(s) = H(s) [U(s) - G(s) Y(s)]$$

$$Y(s) = H(s) U(s) - \underbrace{H(s) G(s) Y(s)}$$

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

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

New System. Pólos ??

Caso 1:  $G(s) \downarrow$   $Y(s) = H(s) U(s)$  No control.

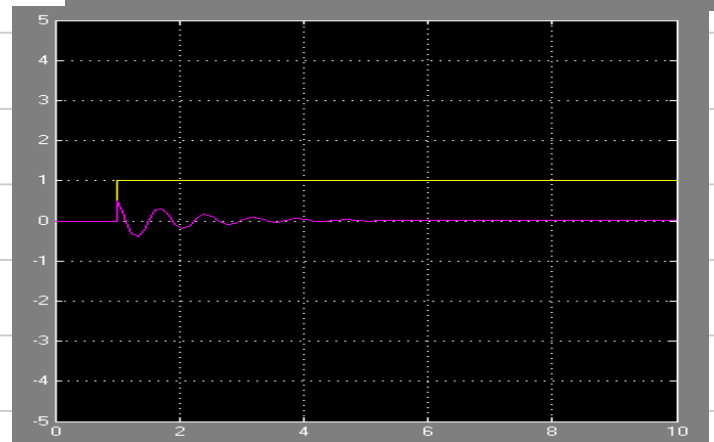
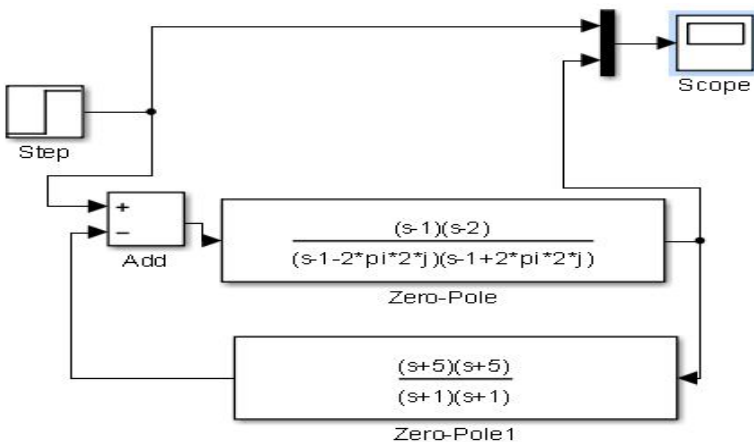
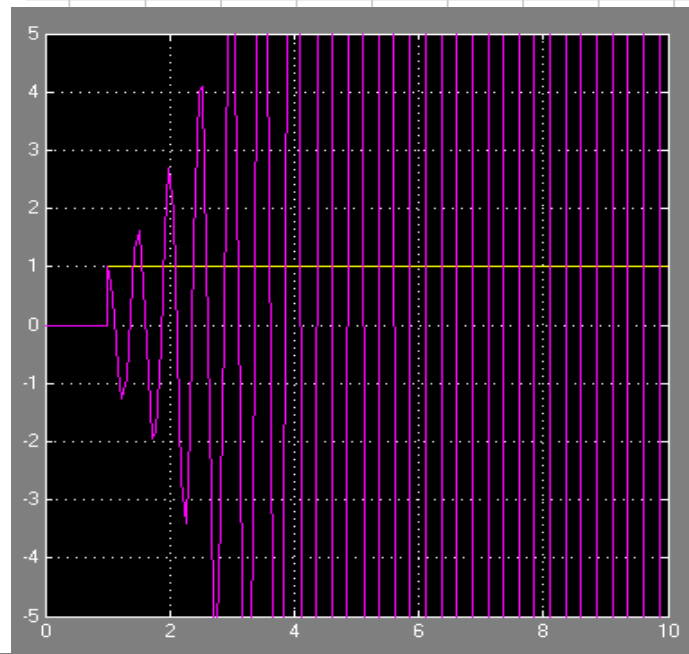
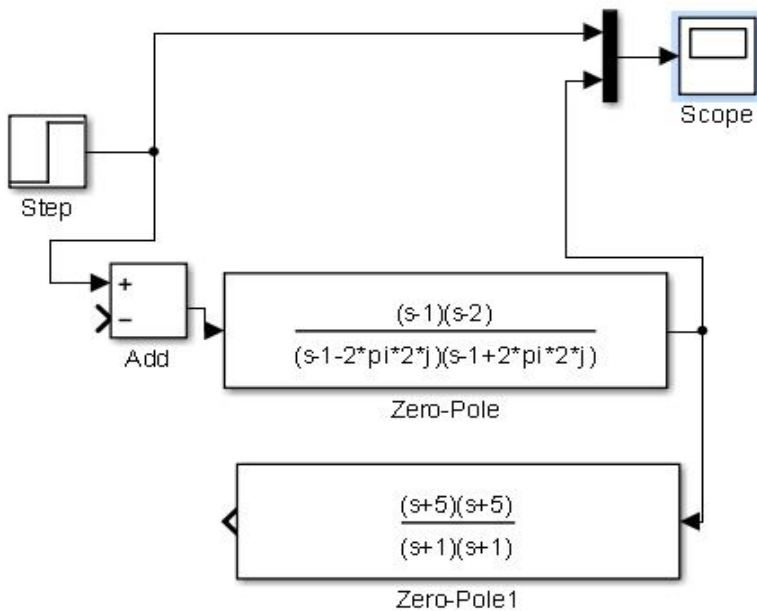
Caso 2:  $G(s) \uparrow$   $1 + H(s) G(s) \approx H(s) G(s)$

$$Y(s) \approx \frac{\cancel{H(s)} U(s)}{\cancel{H(s)} G(s)}$$

$$Y(s) = G^{-1}(s) U(s)$$

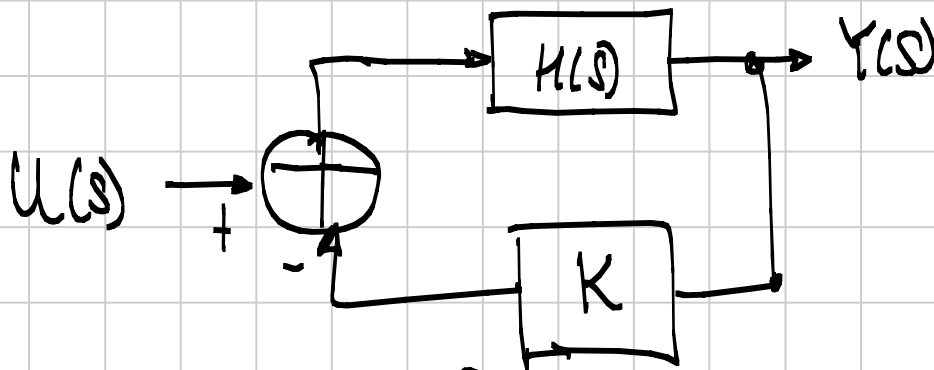
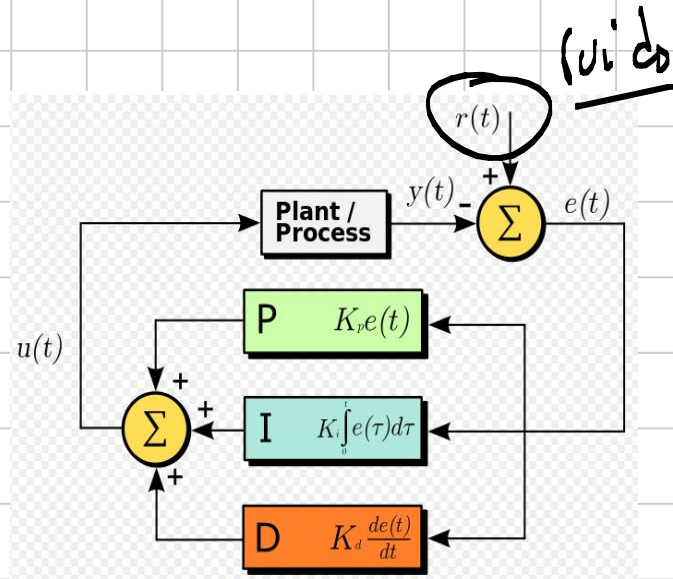
↓ puedo poner los polos donde me da la gama

Ejemplo:



Hay tres tipos generales de controladores;

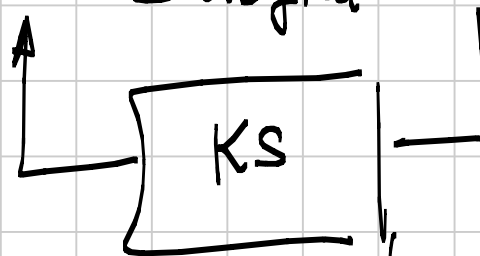
- Proportional.
  - Integral.
  - Derivative.
- Combinación PID los tiene todos!!!



Proportional.



Integral



Derivative.

PID los tiene todos

$$G(s) = K_p + \frac{K_i}{s} + K_d s$$

$$G(s) = K_p + \frac{K_i}{s} + K_d s = \frac{K_d s^2 + K_p s + K_i}{s}$$