



INSTALACIONES Y CONTROL

ESTABILIDAD DE LOS SISTEMAS DE CONTROL

- 1) Aplique el Criterio de Estabilidad de Routh Hurtwitz para analizar la estabilidad de las siguientes FT de lazo abierto.

$$a) G(s)H(s) = \frac{1000}{s + 2000}$$

$$b) G(s)H(s) = \frac{10(s + 1)}{s(s + 10)}$$

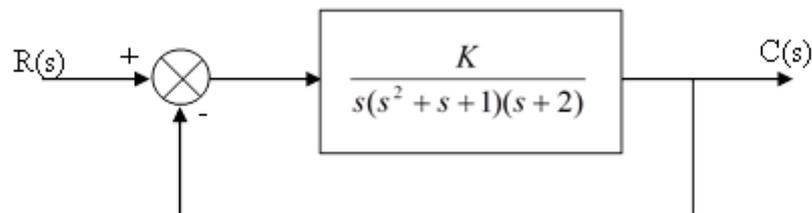
$$c) G(s)H(s) = \frac{100}{\left(\frac{s}{50} + 1\right)\left(\frac{s}{100} + 1\right)}$$

$$c) G(s)H(s) = \frac{5(s + 1)(s + 100)}{(s + 5)(s + 10)}$$

$$d) G(s)H(s) = \frac{10\left(\frac{s}{2} + 1\right)}{s^2\left(\frac{s}{4} + 1\right)\left(\frac{s}{6} + 1\right)}$$

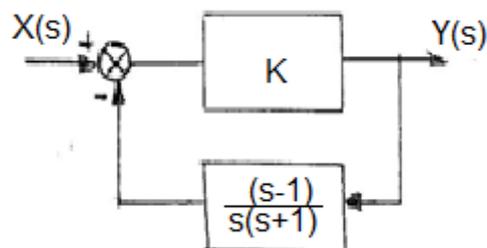
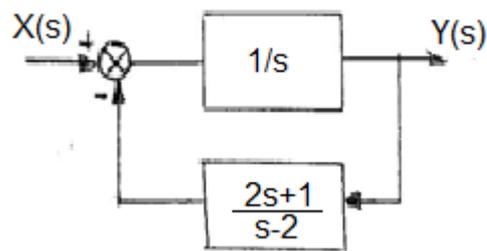
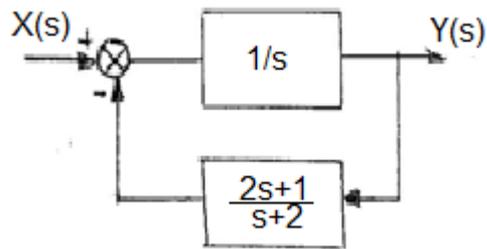
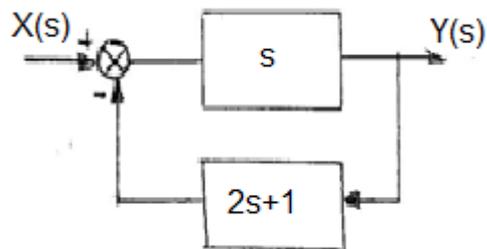
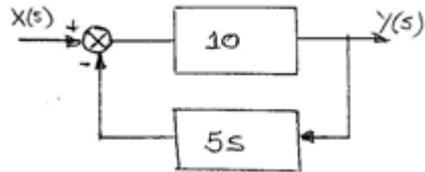
$$e) G(s)H(s) = \frac{10(s + 3)}{s(s + 2)(s^2 + s + 2)}$$

- 2) En el Sistema de Control de la figura siguiente, determine el rango de K donde el Sistema sea estable.



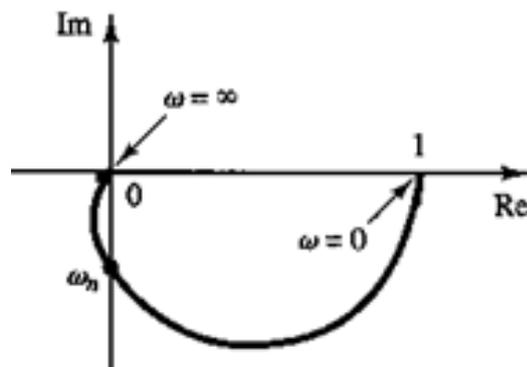
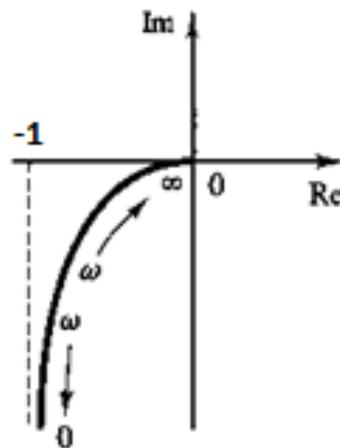
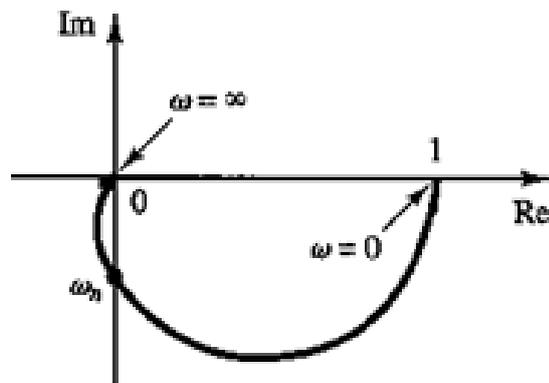
- 3) Verifique estabilidad aplicando el Criterio de Routh-Hurtwitz. Indique si son de Fase mínima o no mínima.

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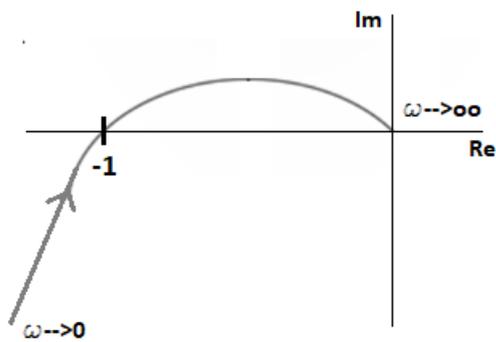
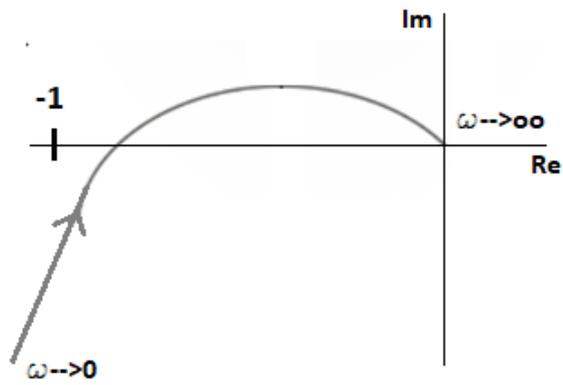
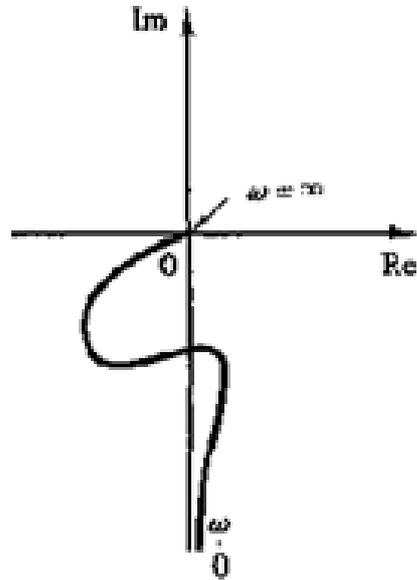


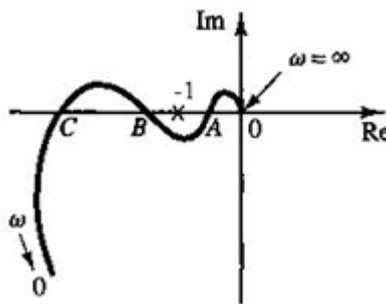
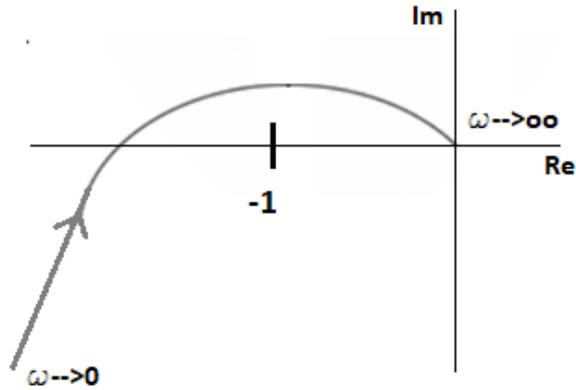
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- 4) Indique si los siguientes sistemas son estables, inestables ó críticos. El Sistema de lazo abierto es un Sistema de Fase Mínima. Represente gráficamente los MG y MF.



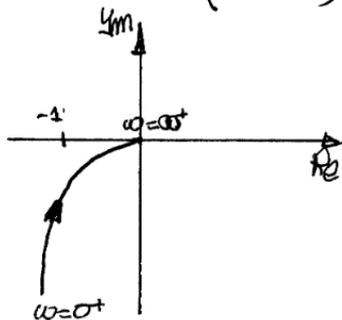
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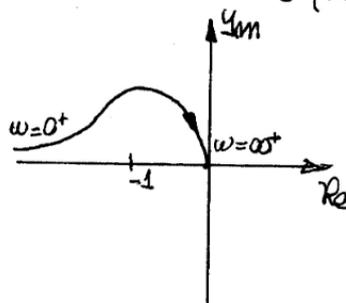


5) Calcule los Valores de K para los que la FT de lazo cerrado es Estable, inestable y presenta estabilidad critica.

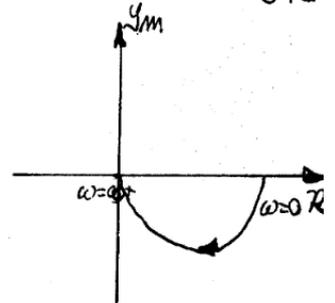
a) $G(s)H(s) = \frac{K}{S(Ts+1)}$

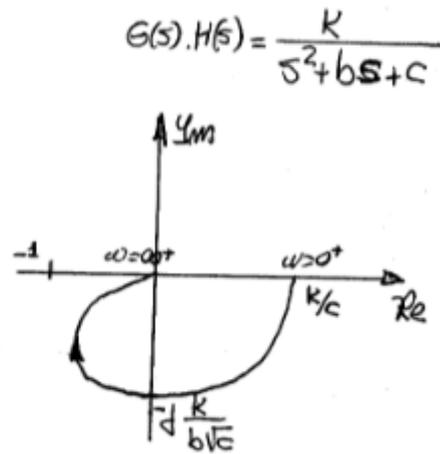
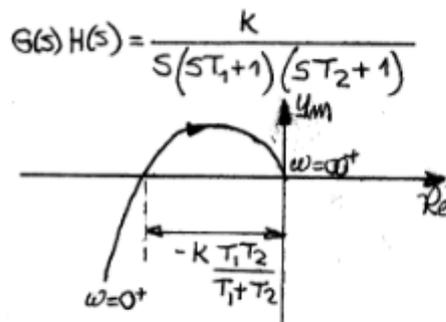


b) $G(s)H(s) = \frac{K}{S^2(Ts+1)}$



c) $G(s)H(s) = \frac{k}{Ts+1}$





6) En las gráficas de los puntos 4 y 5, dibuje el margen de Ganancia y Fase.