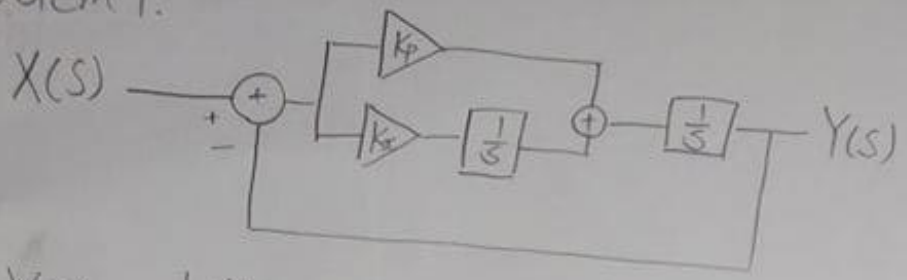
SAS HW8 106061218 李冠恩

Problem 1.



$$Y(S) = \frac{1}{S}\left(K_P(X(S)-Y(S)) + K_I\left(\frac{1}{S}(X(S)-Y(S))\right)\right)$$

$$\Rightarrow \frac{Y(S)}{X(S)} = \frac{(K_P + K_I \cdot \frac{1}{S})\frac{1}{S}}{1+(K_P+K_I\frac{1}{S})\frac{1}{S}} = \frac{K_P S + K_I}{S^2 + K_P S + K_I}$$

$$= \frac{3S+2}{S^2+3S+2} = \frac{-1}{S+1} + \frac{4}{S+2} = H(S)$$

① When $Re\{s\} > -1$

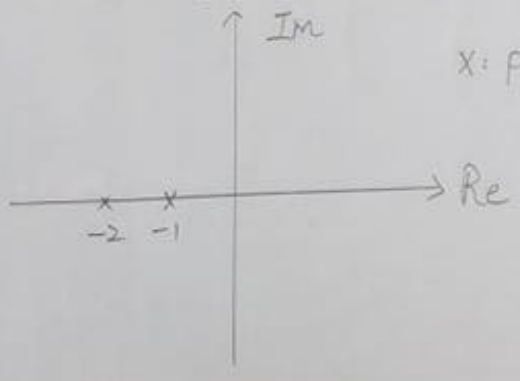
$$h(t) = -e^{-t}u(t) + 4e^{-2t}u(t)$$

② $-2 < \sigma < -1$

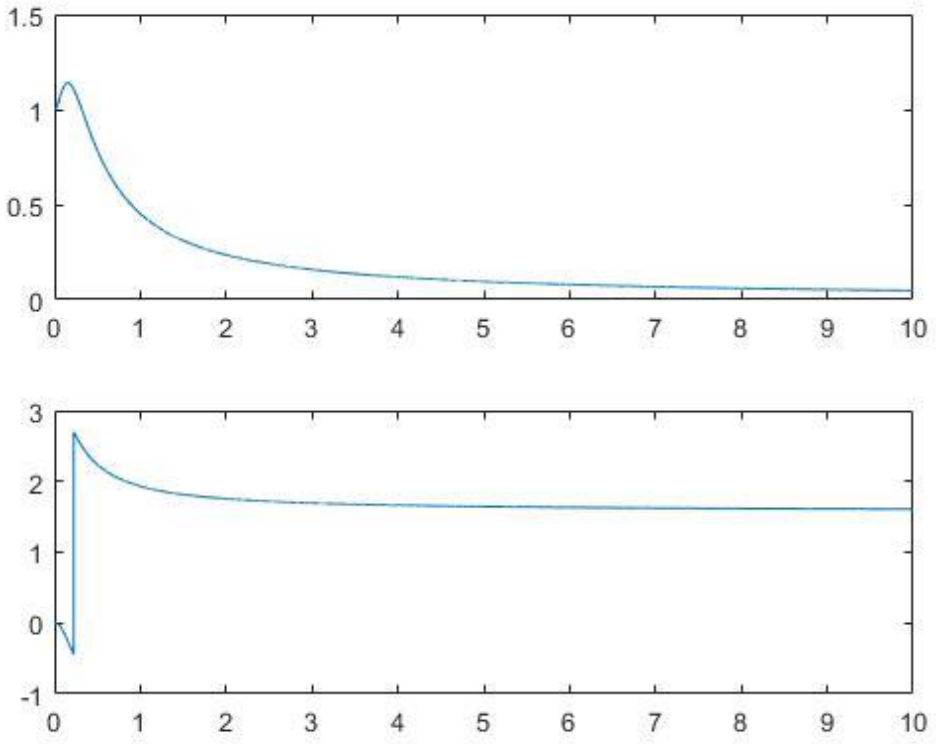
$$h(t) = -e^{-t}u(-t) + 4e^{-2t}u(t)$$

③ $\sigma < -2$

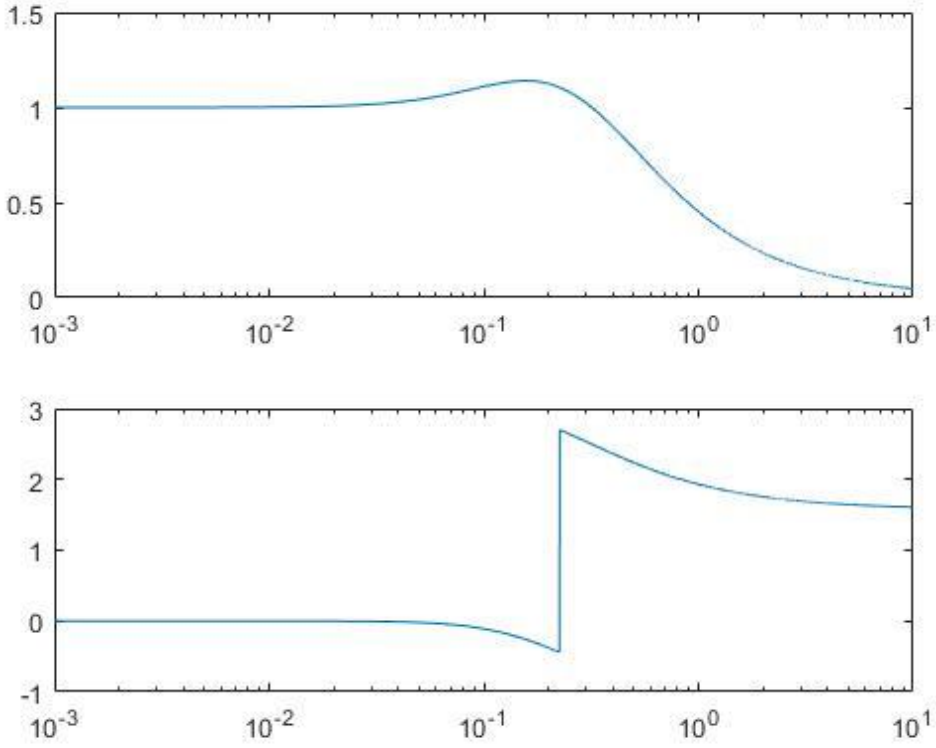
$$h(t) = -e^{-t}u(-t) - e^{-2t}u(-t)$$



Bode plot（不改刻度）



Bode plot（取對數）



Problem 2