RISPOSTA AL GRADINO

PRIMO ORDINE A.STABILE NO ZERI

$$G(S) = \frac{1}{1+ST} = \frac{1}{T(S+\frac{1}{T})} = \frac{\frac{1}{T}}{S+\frac{1}{T}}$$ dove T è la costante di trasferimento ρ

SECONDO ORDINE A.STABILE NO ZERI

$\cos \rightleftharpoons \frac{S}{S^2+\omega_n^2}$ $\quad$ $\sin \rightleftharpoons \frac{\omega_n}{S^2+\omega_n^2}$

$$G(S) = \frac{\omega_n^2}{S^2+2\rho\omega_n S+\omega_n^2} \Rightarrow Y(S) = \frac{1}{S} - \frac{S+\rho\omega_n}{(S+\rho\omega_n)^2+\omega_n(1-\rho^2)} - \frac{\rho\omega_n}{\omega_n\sqrt{1-\rho^2}\,(S+\rho\omega_n)}$$

$$\Rightarrow y(t) = \left\{ 1 - e^{-\rho\omega_n t}\left[\cos(\omega_d t) + \frac{\rho\omega_n}{\omega_d}\sin(\omega_d t)\right]\right\} \cdot 1(t)$$

Calcolo valori risposta

Tempo assestamento $\quad T_a = \frac{4.6}{\rho\omega_n}$

Sovraelongazione percentuale $\quad S\% = e^{-\frac{\pi\rho}{\sqrt{1-\rho^2}}}$

Tempo di salita $\quad T_R = \frac{1.8}{\omega_n}$ con $\rho = 0.5$