

Spring 2021

控制系統
Control Systems

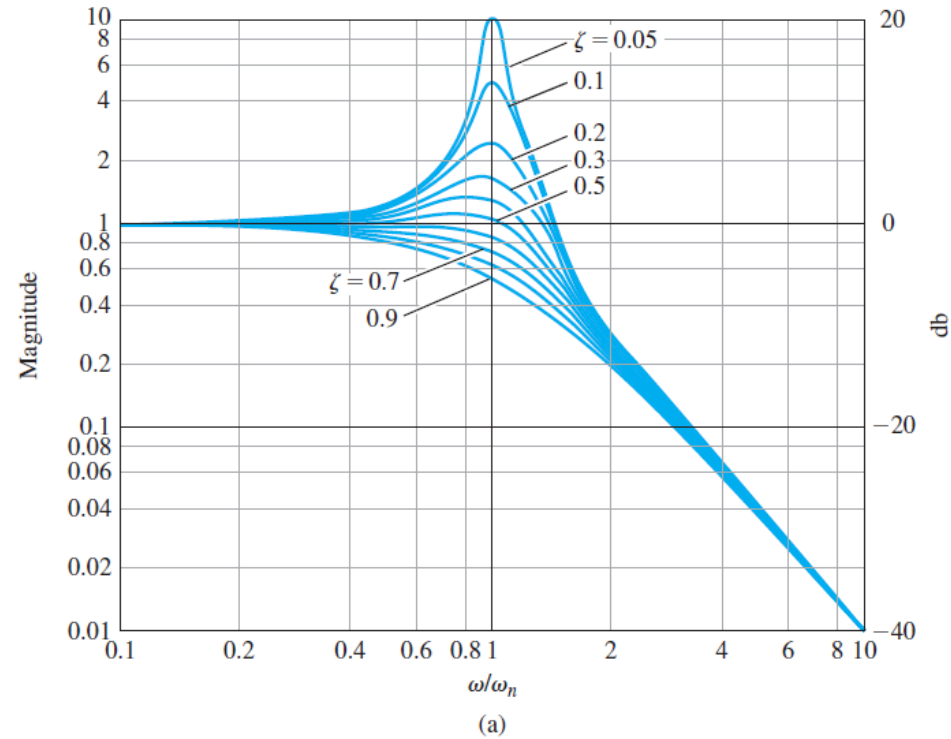
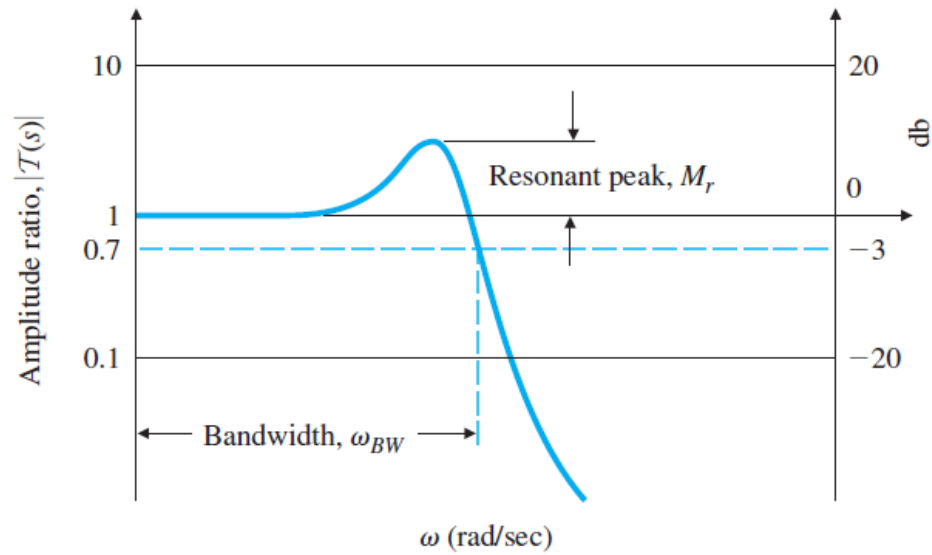
Unit 6H
Closed-Loop Frequency Response

Feng-Li Lian

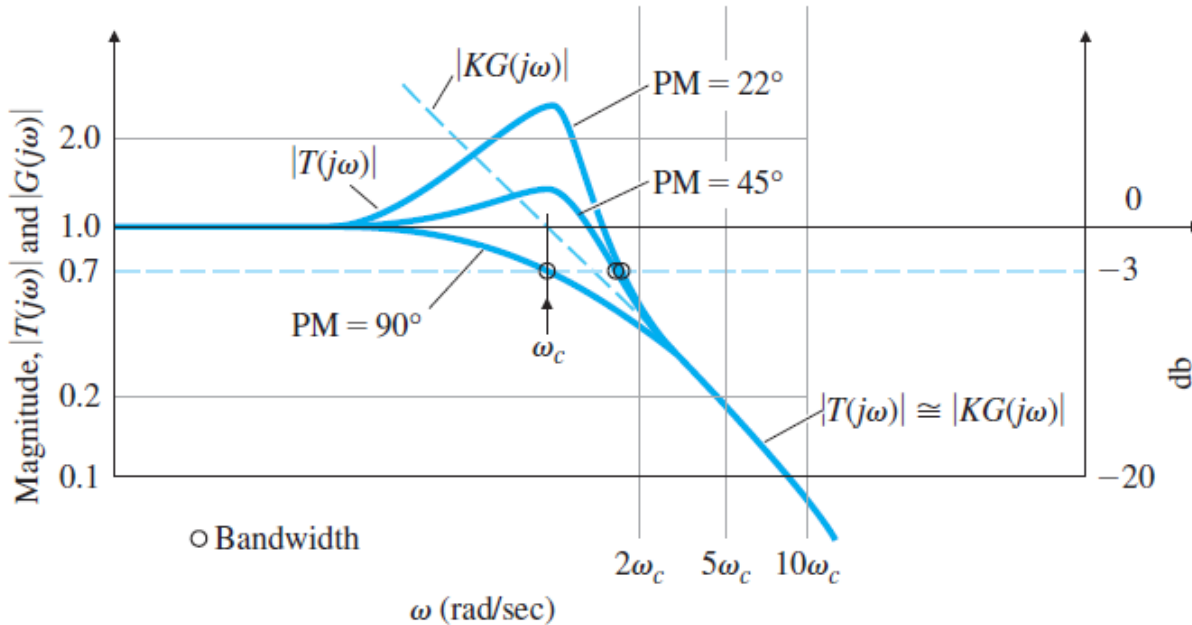
NTU-EE

Feb – Jun, 2021

Closed-Loop Frequency Response - Bandwidth



■ Closed-Loop Bandwidth ω_{BW}



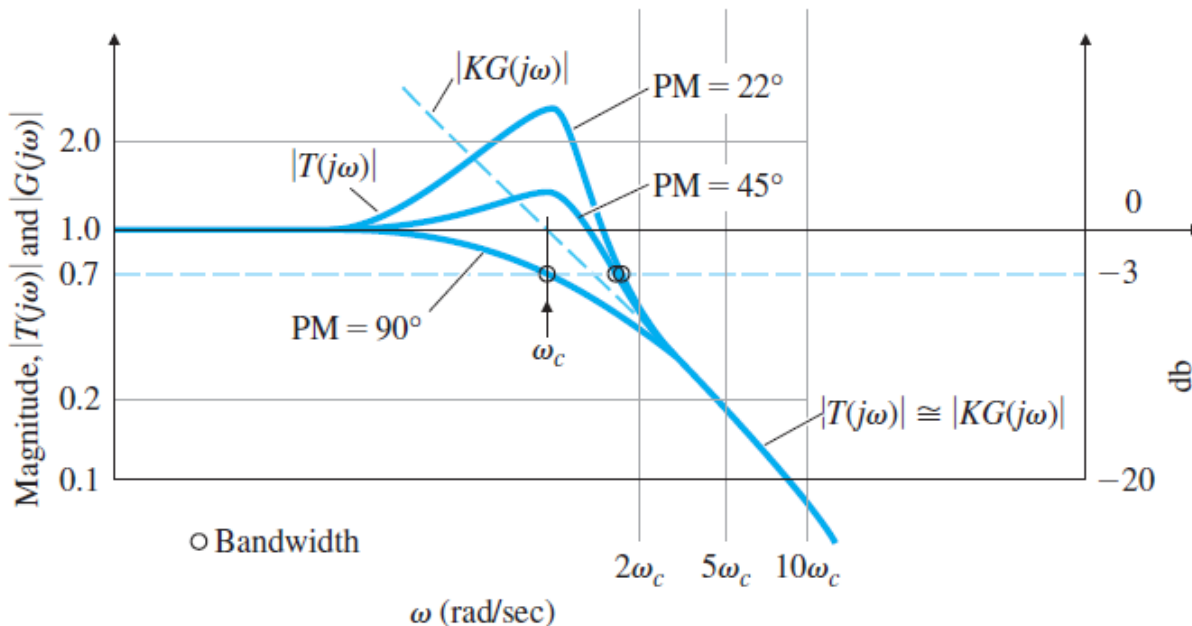
$$|KG(j\omega)| \gg 1 \quad \text{for } \omega \ll \omega_c$$

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$$|T(j\omega)| = \left| \frac{KG(j\omega)}{1 + KG(j\omega)} \right| \approx \begin{cases} 1, & \omega \ll \omega_c \\ |KG|, & \omega \gg \omega_c \end{cases}$$

near ω_c $|KG(j\omega)| = 1$

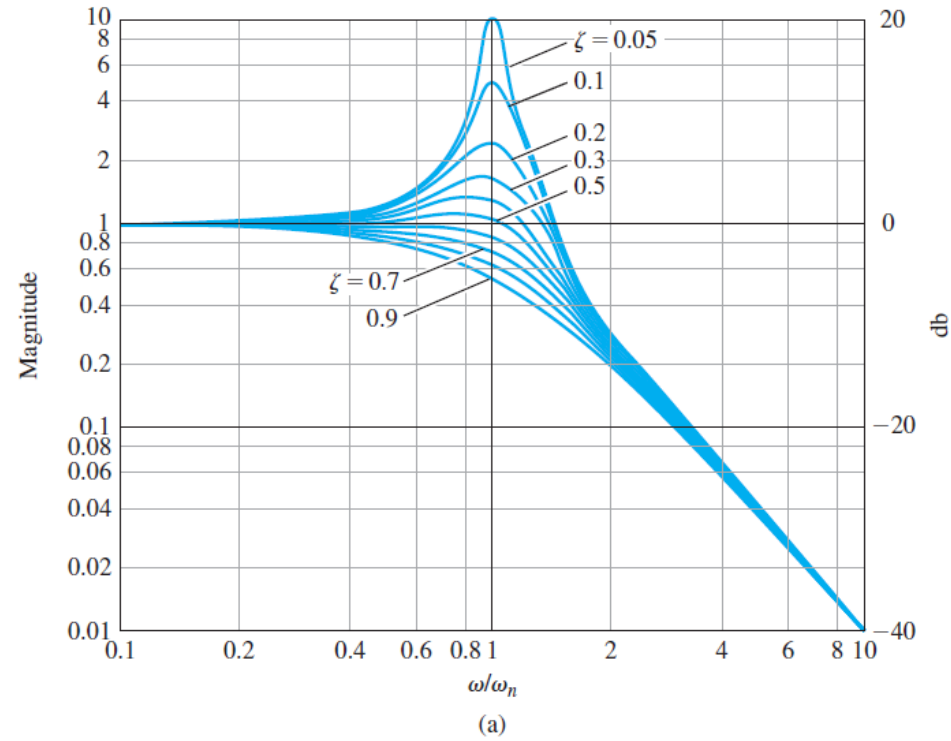
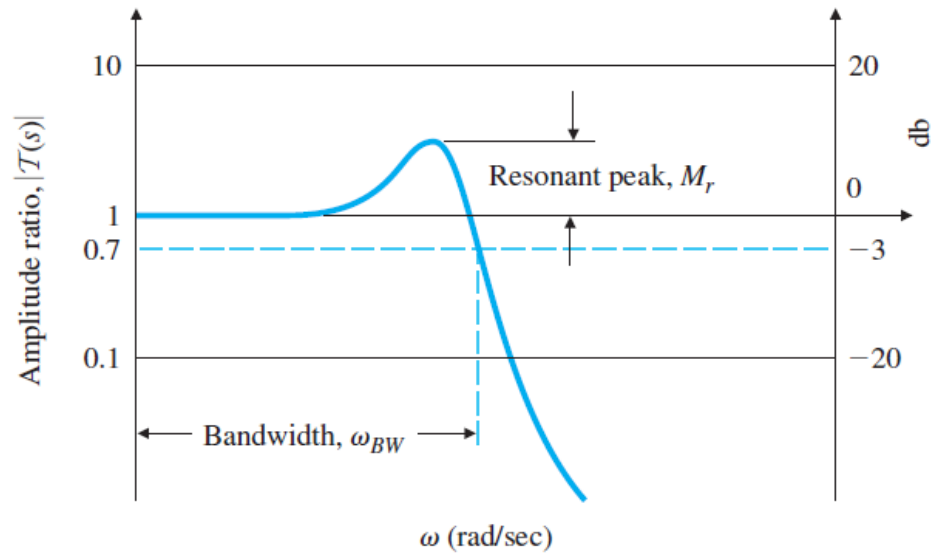
$|T(j\omega)|$ depends heavily on the PM



$$|T(j\omega_c)| = 1.31$$

$$|T(j\omega_c)| = 0.707$$

$$\Rightarrow \omega_c \leq \omega_{BW} \leq 2\omega_c$$



Resonant-Peak Magnitude M_r

