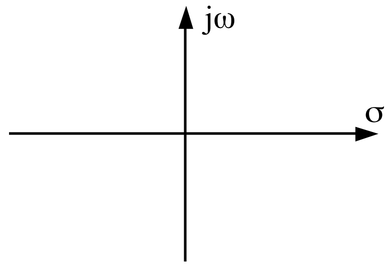
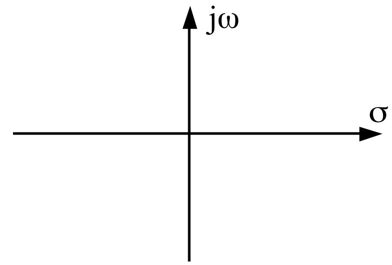
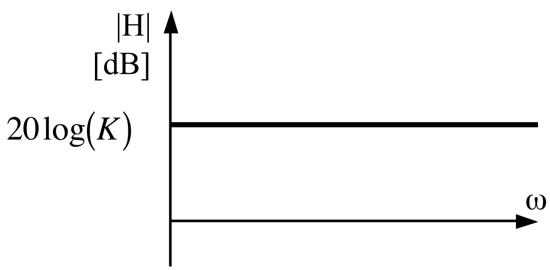
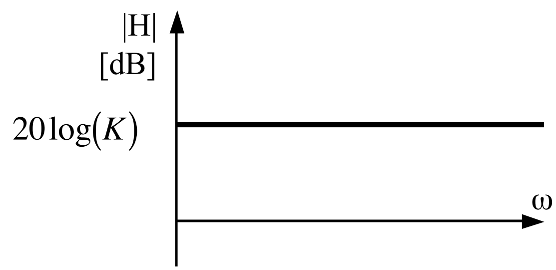
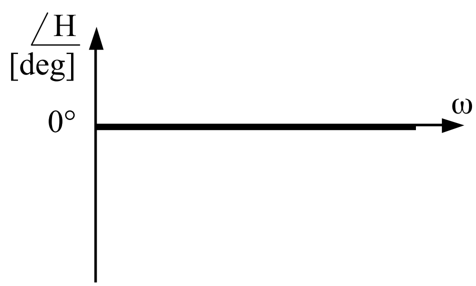
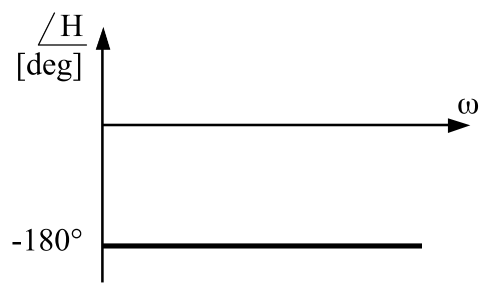
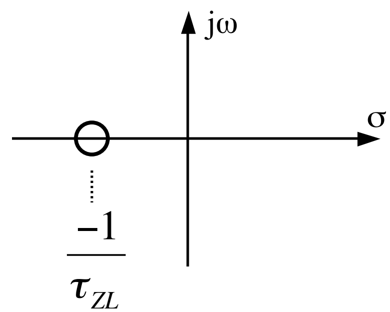
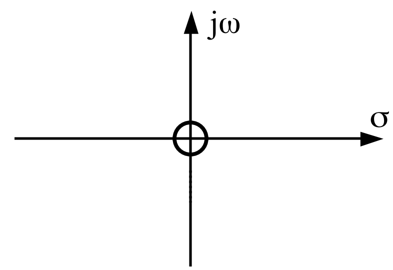
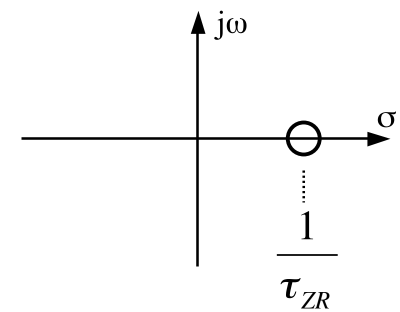
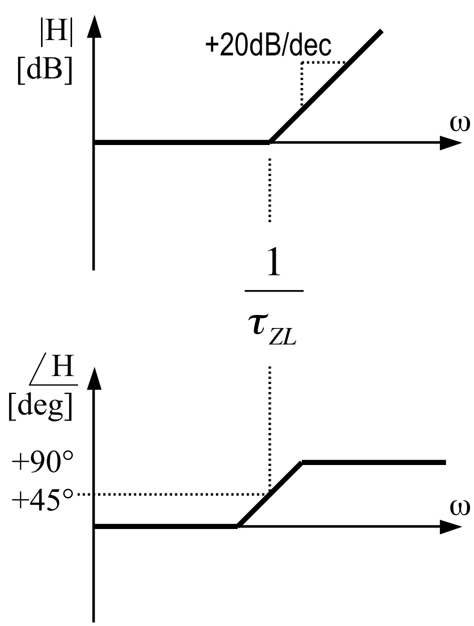
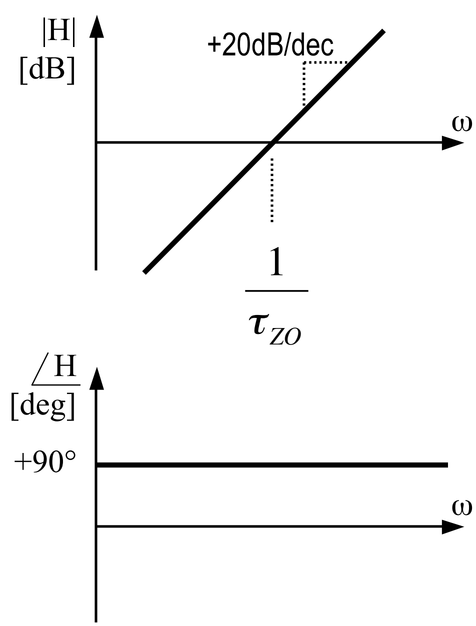
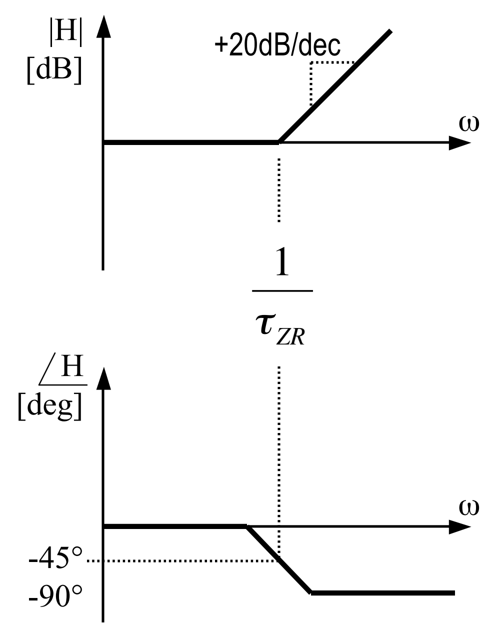
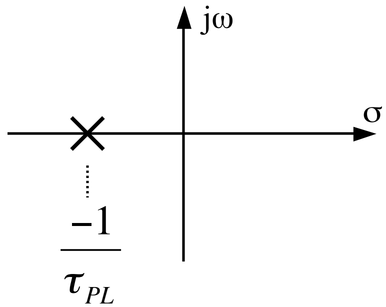
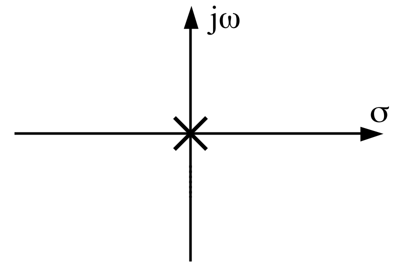
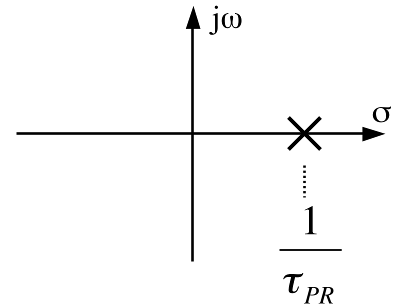
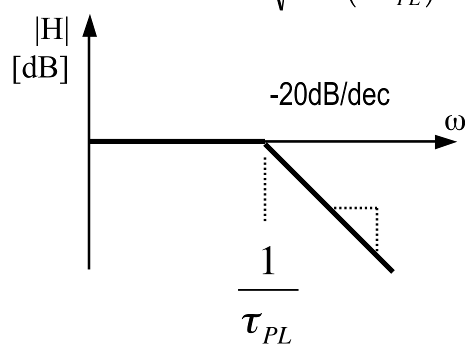
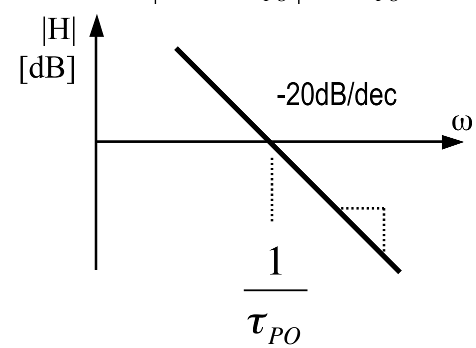
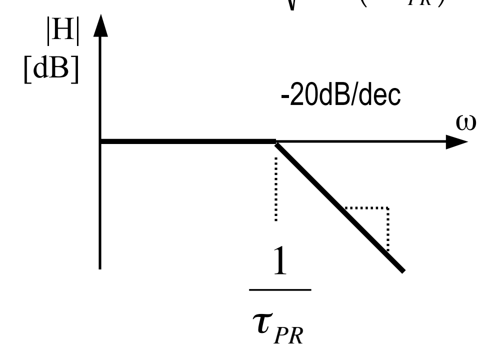
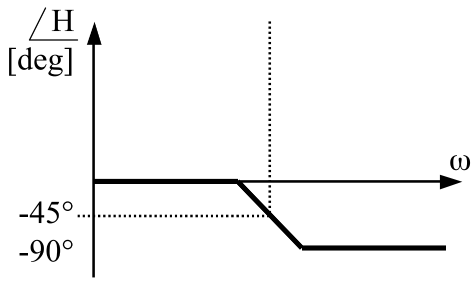
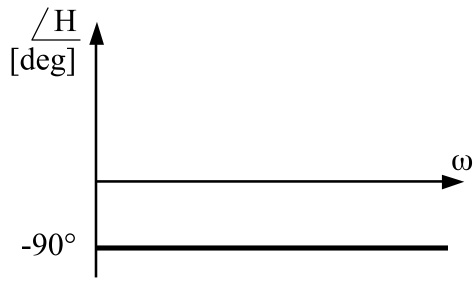
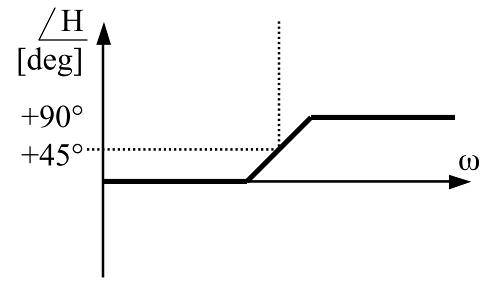
BODE PLOT - S-PLANE REVIEW

	NONINVERTING DC GAIN	INVERTING DC GAIN
TERM IN H(s)	$+K$	$-K$
S-PLANE	 (NOT VISIBLE IN S-PLANE)	 (NOT VISIBLE IN S-PLANE)
BODE PLOT: LET s = jω MAGNITUDE	$\lvert +K \rvert = K$ 	$\lvert -K \rvert = K$ 
PHASE	 $\angle K = \tan^{-1}(0/K) = 0$	 $\angle -K = \tan^{-1}(0/-K) = -180$

	LHP ZERO	ZERO AT ORIGIN (DERIVATIVE)	RHP ZERO
TERM IN H(s)	$1+s\tau_{ZL}$	$s\tau_{ZO}$	$1-s\tau_{ZR}$
S-PLANE			
BODE PLOT: LET s = jω MAGNITUDE PHASE	$\lvert 1+j\omega\tau_{ZL}\rvert = \sqrt{1^2+(\omega\tau_{ZL})^2}$  $\angle 1+j\omega\tau_{ZL} = \tan^{-1}(\omega\tau_{ZL})$	$\lvert 0+j\omega\tau_{ZO}\rvert = \omega\tau_{ZO}$  $\angle 0+j\omega\tau_{ZL} = \tan^{-1}\left(\frac{\omega\tau_{ZL}}{0}\right) = +90^\circ$	$\lvert 1-j\omega\tau_{ZR}\rvert = \sqrt{1^2+(\omega\tau_{ZR})^2}$  $\angle 1-j\omega\tau_{ZR} = \tan^{-1}(-\omega\tau_{ZR})$

	LHP POLE	POLE AT ORIGIN (INTEGRATOR)	RHP POLE
TERM IN H(s)	$\dfrac{1}{1+s\tau_{PL}}$	$\dfrac{1}{s\tau_{PO}}$	$\dfrac{1}{1-s\tau_{PR}}$
S-PLANE			
BODE PLOT: LET s = jω MAGNITUDE	$\left\lvert\dfrac{1}{1+j\omega\tau_{PL}}\right\rvert=\dfrac{1}{\sqrt{1^2+(\omega\tau_{PL})^2}}$ 	$\left\lvert\dfrac{1}{0+j\omega\tau_{PO}}\right\rvert=\dfrac{1}{\omega\tau_{PO}}$ 	$\left\lvert\dfrac{1}{1-j\omega\tau_{PR}}\right\rvert=\dfrac{1}{\sqrt{1^2+(\omega\tau_{PR})^2}}$ 
PHASE	 $\angle 1/(1+j\omega\tau_{PL})=-\tan^{-1}(\omega\tau_{PL})$	 $\angle 1/(0+j\omega\tau_{PO})=-\tan^{-1}(\omega\tau_{PO}/0)=-90^\circ$	 $\angle 1/(1-j\omega\tau_{PR})=\tan^{-1}(\omega\tau_{PR})$

GENERAL TRANSFER FUNCTION

$$H(s) \quad = \quad \pm K \, \frac{\overbrace{s\tau_{ZO}}^{\text{ZERO AT ORIGIN}} \cdots \overbrace{(1 + s\tau_{ZL})}^{\text{LHP ZERO}} \cdots \overbrace{(1 - s\tau_{ZR})}^{\text{RHP ZERO}}}{\underbrace{s\tau_{PO}}_{\text{POLE AT ORIGIN}} \cdots \underbrace{(1 + s\tau_{PL})}_{\text{LHP POLE}} \cdots \underbrace{(1 - s\tau_{PR})}_{\text{RHP POLE (UNSTABLE MODE!)}}}$$