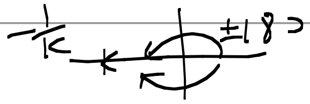


$L(s) = -\frac{1}{K}$ C.E. $\boxed{1+KL(s)=0}$

hw 8 departure angles

Note Title 11/17/2008

\#7 $L(s) = \dfrac{(s+1)}{(s+2+2j)(s+2-2j)}$

$$\begin{cases} z_1 = -1 \quad \checkmark \\ p_1 = -2+2j \quad \checkmark \\ p_2 = -2-2j \end{cases}$$

RL → Angle condition

test point s_0

$$L(s) = \frac{(s-z_1)}{(s-p_1)(s-p_2)}$$

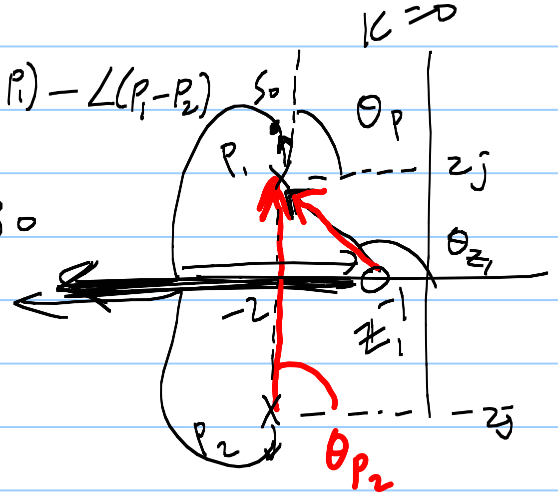
$$\angle L(s_0) = \angle(s_0 - z_1) - \angle(s_0 - p_1) - \angle(s_0 - p_2)$$

$$= \pm 180^\circ$$

$$\lim_{s_0 \to p_1} \angle L(s_0) = \angle(p_1 - z_1) - \lim_{s_0 \to p_1} \angle(s_0 - p_1) - \angle(p_1 - p_2)$$

$$= \theta_{z_1} - \theta_{dep} - \theta_{p_2} = \pm 180$$

$$\theta_{dep} = \pm 180 + \theta_{z_1} - \theta_{p_2}$$



$CE \Rightarrow 1 + KL(s) = 0 \qquad L(s) = -\frac{1}{K}$ $\quad \angle \pm 180$

hw 8

#5 $\qquad L(s) = \dfrac{1}{s(s-p_1)(s-p_2)}$ $\qquad p_0 = 0$, $p_1 = -4+4j$, $p_2 = -4-4j$

RL → Angle condition

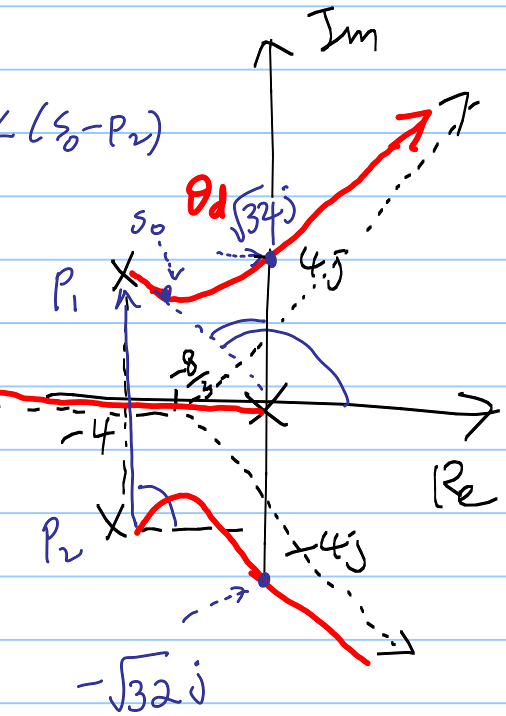
$$\angle L(s_0) = \angle 1 - \angle s_0 - \angle(s_0 - p_1) - \angle(s_0 - p_2) = \pm 180°$$

$$\lim_{s_0 \to p_1} \angle L(s_0) = -\angle p_1 - \boxed{\lim_{s_0 \to p_1} \angle(s_0 - p_1)} - \angle(p_1 - p_2)$$

// θ_{dep}

$$= -135° - \theta_{dep} - 90° = \pm 180°$$

$$\theta_{dep} = 180° - 90° - 135° = 90° - 135° = -45°$$



$\boxed{s = j\omega}$ $\qquad CE \quad 1 + KL(s) = 0$

$$1 + \frac{K}{s[s^2 + 8s + 32]} = 0$$

$CE.\quad s^3 + 8s^2 + 32s + K = 0$

$$(j\omega)^3 + 8(j\omega)^2 + 32(j\omega) + K = 0$$

$$\underbrace{(-8\omega^2 + K)}_{=0} + \underbrace{(-\omega^3 + 32\omega)}_{=0} j = 0$$

① $\qquad$ ②

From ② $\Rightarrow \quad \omega(\omega^2 - 32) = 0$

$$\omega = \pm\sqrt{32}$$

From ① $\quad K = 8\omega^2$

$$= 8(32) = 256$$