

Quiz 2. Jan. 23, 2012

2. Construct the Bode plot of the phase shift versus frequency ω for the following $F_L(s)$ function. Start by writing down the expression for the total phase shift showing the contribution from each pole and zero. Draw on the plot using a dotted line the phase shift contribution from each pole or zero and label it.

$$F_L(s) = \frac{s(s+2)}{(s+25)(s+700)} = \frac{\left(1 + \frac{2}{s}\right)}{\left(1 + \frac{25}{s}\right)\left(1 + \frac{700}{s}\right)} = \frac{\left(1 - j\frac{2}{\omega}\right)}{\left(1 - j\frac{25}{\omega}\right)\left(1 - j\frac{700}{\omega}\right)}$$

$$\phi(\omega) = -\tan^{-1}\left(\frac{2}{\omega}\right) + \tan^{-1}\left(\frac{25}{\omega}\right) + \tan^{-1}\left(\frac{700}{\omega}\right)$$

