# EENG307: Lecture 27 Handout

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This is a handout illustrating the sketching process for the Bode plot of

$$G(s) = \frac{s-1}{s+10}$$

Answers are available in the Lecture 27 article.

Before beginning to work through the questions, put $G(s)$ in "Bode form" by factoring out the coefficients on $s^0 = 1$ from the numerator and denominator of $G(s)$.

Next, work through these questions. A set of blank Bode axes is available on the reverse.

**Questions for Example Bode Plot**

1. What is the magnitude in dB of the DC gain of $G(s)$? In other words, what is $20\log_{10}(K)$? Mark this value on the magnitude Bode plot at the left edge. *Hint: use the "Bode form" of* $G(s)$.

2. What is the low frequency phase of $G(s)$, i.e., $\angle K$? Mark this point on the phase Bode plot at the left edge.

3. Will the magnitude at high frequencies be smaller or larger than the magnitude at low frequencies (near DC)? *Hint: think about moving from left to right along the* $x$ *axis of the Bode plot, i.e., from lower or higher frequencies. Do you encounter the frequency of the zero* $\sigma_z$ *or the pole* $\sigma_p$ *first? If you encounter the zero first, the magnitude plot has a positive slope, whereas if you encounter the pole first, the magnitude plot has a negative slope.*

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4. What will be the total phase change of the phase Bode plot given the RHP zero and LHP pole? Add this total phase change to your low-frequency phase found in #2 and mark the result on the right side of the phase Bode plot, i.e., at high frequency. *Hint: refer to the table in Lecture 27 and remember that phase impacts take place over two decades.*

5. What are the asymptotic phase slopes at medium frequencies (near the zero $\sigma_z$ and the pole $\sigma_p$)? *Hint: refer again to the table in Lecture 27.*