Outline

- The Laplace Transform
- The Region of Convergence (ROC) for Laplace Transforms
- The Inverse Laplace Transform
- Geometric Evaluation of the Fourier Transform
- Properties of the Laplace Transform
- Some Laplace Transform Pairs
- Analysis & Characterization of LTI Systems Using the Laplace Transform
- System Function Algebra and Block Diagram Representations
- The Unilateral Laplace Transform
Problem 9.10: Geometric evaluation and Low- High- Band-Pass

9.10. Using geometric evaluation of the magnitude of the Fourier transform from the corresponding pole-zero plot, determine, for each of the following Laplace transforms, whether the magnitude of the corresponding Fourier transform is approximately lowpass, highpass, or bandpass:

(a) \( H_1(s) = \frac{1}{(s + 1)(s + 3)}, \quad \text{Re}\{s\} > -1 \)

(b) \( H_2(s) = \frac{s}{s^2 + s + 1}, \quad \text{Re}\{s\} > -\frac{1}{2} \)

(c) \( H_3(s) = \frac{s^2}{s^2 + 2s + 1}, \quad \text{Re}\{s\} > -1 \)
9.25. By considering the geometric determination of the Fourier transform, as developed in Section 9.4, sketch, for each of the pole-zero plots in Figure P9.25, the magnitude of the associated Fourier transform.

(a) \( \Re \) \[ \dot{I}_m \quad \bigcirc - j \omega_0 \]

(b) \( \Re \) \[ \dot{I}_m \quad \times - j \omega_0 \]

(c) \( \Re \) \[ \dot{I}_m \quad \bigcirc - j \omega_0 \quad \times \quad \bigcirc - b - a \quad \bigcirc \quad \bigcirc - a \quad \bigcirc \quad \bigcirc - b \quad \bigcirc \]

(d) \( \Re \) \[ \dot{I}_m \quad \bigcirc - j \omega_0 \quad \bigcirc \quad \bigcirc \]

(e) \( \Re \) \[ \bigcirc - j \omega_0 \]

(f) \( \Re \) \[ \bigcirc \quad \bigcirc \]