

University of Nebraska-Lincoln

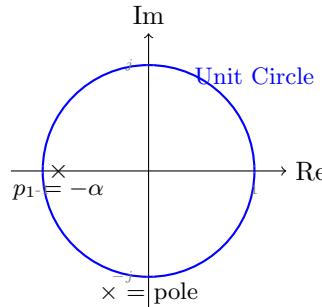
Digital Signal Processing: Quiz 6

November 7, 2025

Name: _____

Total Points: 10

Given: A discrete-time LTI system has the following pole-zero plot in the z-plane:



The pole is located at $z = -\alpha$ (where $0 < \alpha < 1$).

The corner frequency is then: $\omega_c = \pi - \arccos(\alpha)$

Assume $10\omega_c$ is within the Nyquist frequency range ($10\omega_c < \pi$).

1. (10 points) Based on the pole-zero plot above,

- (a) (6 points) Sketch an approximation of the magnitude $|H(e^{j\omega})|$ and phase $\angle H(e^{j\omega})$ response.
- (b) (2 points) In 1-2 sentences, explain how the pole location influences the shape of the magnitude and phase responses.
- (c) (2 points) What type of filter does this system represent (e.g., low-pass, high-pass, band-pass, band-stop)?

