

ECE113, Winter 2023

Digital Signal Processing

University of California, Los Angeles; Department of ECE

Quiz #15

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10 points total.

Name: _____

UID: _____

1. (10 points) What is the region of convergence of the \mathcal{Z} -transform of the sequence $x[n] = \delta[n]$?
Hint: Recall that the \mathcal{Z} -transform of a sequence $x[n]$ is defined as $X(z) = \sum_{n=-\infty}^{\infty} x[n]z^{-n}$.
- A. Within the unit circle.
 - B. Just the unit circle.
 - C. The entire z -plane.
 - D. Outside of the unit circle.

Solution:

$$X(z) = \sum_{n=-\infty}^{\infty} \delta[n]z^{-n} = z^{-0} = 1 \quad (1)$$

The answer is (C.), since the corresponding region of convergence for this \mathcal{Z} -transform is the entire z -plane.