DSP Quiz #2

10/7/20

Name:

Question 1: Consider a causal linear time-invariant system with system function H(z) and real impulse response. H(z) is evaluated for z = ejω and is shown in the figure below:

Diagram

Description automatically generated

1 point each:

1. Carefully sketch a pole–zero plot for H(z) showing all information about the pole and zero locations that can be inferred from the figure.
2. What can be said about the length of the impulse response? Justify your answer
3. Is this a linear phase system? How can you tell?
4. Is this system stable? How can you tell?
5. Is this an all-pass system? How can you tell?
6. Is this a minimum-phase system? How can you tell?

Question 2:

Consider the following system function:

1. (1 point) Sketch the pole-zero plot for H(z)
2. (1 point)Write the difference equation that relates the input and the output of this system
3. (2 points)Find expressions for a minimum-phase system such that H1(z) and an all-pass system Hap(z) such that H(z) = H1(z)Hap(z)