Assignment 1
EE3900

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***Abstract*—This document contains the solution to Oppenheimer problem 3.4(c),**

Question 3.4(c): Consider the z-transform $X(z)$ whose pole-zero plot is as shown in Figure 1.

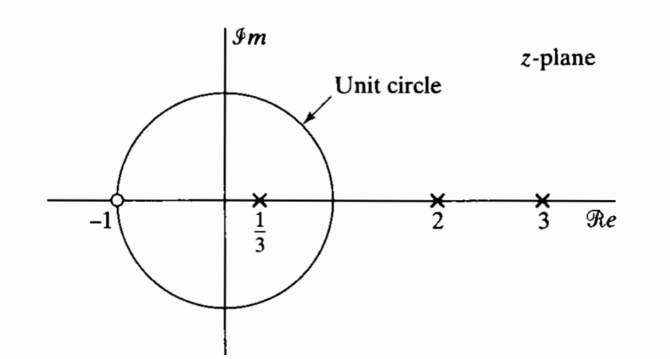

Fig. 1. Pole Zero plot of $X(n)$

Is it possible for the pole-zero plot in Figure 1 to be associated with a sequence that is both stable and causal? If so, give the appropriate region of convergence.

Solution For stability of the system, ROC must contain the unit circle. So, possible options is

$$|\frac{1}{3}| < |z| < |2| \tag{1}$$

For causality, the ROC must be outside of outermost pole which is 3 in this case. So, possible option is

$$|z| > |3| \tag{2}$$

Since nothing is common between two, so there is no possible signal which is both stable and causal.