Problem # 1.0

In class, we looked at the upsampling system defined via the input-output mapping:

$$y_1[n] = L_1\left(x[n]\right) = x[n/L]$$

Here wish to study this mapping further by looking at its properties:

1. show that this system is a *linear time-varying* (LTV) system

2. Is this system causal?

3. Is this system memoryless?

4. Is this system BIBO stable?

Problem # 2.0

For the down-sampling system studied in the class, defined via the mapping:

$$y_2[n] = L_2\left(x[n]\right) = x[Mn]$$

1. Show that this system is also a LTV system.

2. Is this system BIBO stable?

3. Is this system causal and/or memoryless?