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Name: Key

EE432 Fall 2011 Quiz 4

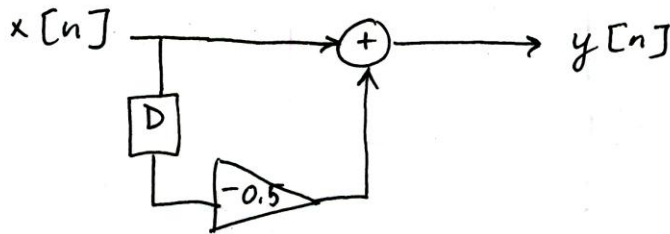
- ① 1. Give an example of a recursive difference equation.

$$y[n] = x[n] - 0.5y[n-1]$$

Your examples will vary.

- ② 2. Give an example of a non-recursive difference equation and draw the corresponding block diagram.

$$y[n] = x[n] - 0.5x[n-1]$$



- ② 3. Is the system represented by the following difference equation FIR or IIR? Why?

$$y[n] + x[n] = 0.5x[n-1] - 0.3x[n-2]$$

$$y[n] = -x[n] + 0.5x[n-1] - 0.3x[n-2]$$

$$\text{let } x[n] = \delta[n] \Rightarrow h[n] = -\delta[n] + 0.5\delta[n-1] - 0.3\delta[n-2]$$

FIR - The impulse response has a finite # of non zero terms.

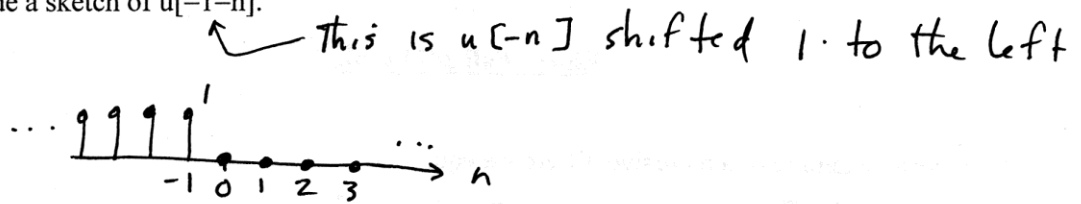
- ② 4. Is the system from problem # 3 BIBO stable or not? Show why or why not.

$$\sum_{n=-\infty}^{\infty} |h[n]| = 1 + 0.5 + 0.3 = 1.8 < \infty$$

BIBO stable

①

5. Provide a sketch of  $u[-1-n]$ .



②

6. Determine the impulse response of the system given by  $y[n] - y[n-1] = x[n]$

$$y[n] = x[n] + y[n-1]$$

$n$	$x[n]$	$y[n-1]$	$y[n]=h[n]$
0	1	0	1
1	0	1	1
2	0	1	1
3	0	1	1
			⋮

②

7. Is the system from problem # 6 BIBO stable or not? Show why or why not.

$$h[n] = u[n]$$

$$\sum_{n=-\infty}^{\infty} |h[n]| = \sum_{n=0}^{\infty} 1 = \infty$$

Not Bibo stable

Bonus: Give the names of 2 of the 3 army commanders that fought in the battle of Waterloo.

Napoleon  
Wellington  
Blucher