

ECE 312 HW#5

① suppose the impulse response for a LTI system is

$$h[0] = 1$$

$$h[1] = -0.5$$

$$h[2] = 0.22$$

$$h[3] = -0.1$$

$$h[4] = 0.07$$

$$h[n] = 0 \quad \forall n \geq 5$$

the input to the LTI system is

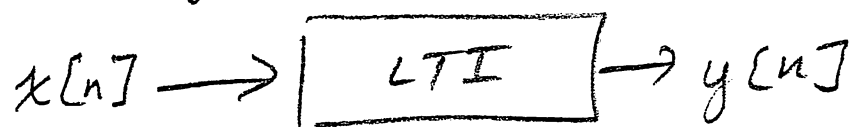
$$x[0] = 1$$

$$x[1] = 0.5$$

$$x[2] = 0.5$$

$$x[n] = 0 \quad \forall n \geq 3$$

find $y[n]$ where



for $n = 0, 1, 2, \dots, 10$

② find $y[n] \forall n \geq 0$
for the system in problem 1
if $x[n] = u[n]$

③ A LTI system is governed by
$$y[n] = x[n] + 0.5y[n-2] - 0.2y[n-3]$$

draw a block diagram of
this system

④ Assume $x[n] = \underset{\substack{\uparrow \quad \uparrow \\ n=0 \quad n=1}}{1, 1, 0, 1, 1, 0, \dots}$

(a) compute the $X[k]$'s using a DTFS

(b) " " " " " DFT

(you must verify both of
your series ~~states~~ exactly
reproduces $x[n]$)

⑤ A LTI system has the governing difference equation

$$y[n] - 0.4y[n-1] = 2x[n-1]$$

Plot the frequency response (magnitude only) of this system.