CPE381, FA24, UAH, Classwork 19, Instructor: Rahul Bhadani

10/30/2024 Name of the student: _____

① Write down the value of the following discrete-signal samples, assuming the commonly used notation: (5 points, 1 point each)

(a) $u[3] = 1$

(b) $u[4] + \delta[3] + 3\delta[0] = 1 + 0 + 3 = 4$

(c) $u[-25] = 0$

(d) $u[-67] + u[67] = 0 + 1 = 1$

(e) $\delta[-3] + \delta[0] + \delta[3] = 0 + 1 + 0 = 1$

② Find the impulse response response $h[n]$ for the following and state whether it is an IIR system or FIR system.

$$y[n] = x[n] - 2x[n-2] + x[n-3]$$ (5 points)

Solution

Impulse response is found by setting $x[n] = \delta[n]$ so that $y[n] = h[n]$

So $h[n] = \delta[n] - 2\delta[n-2] + \delta[n-3]$

Clearly it only has three points such

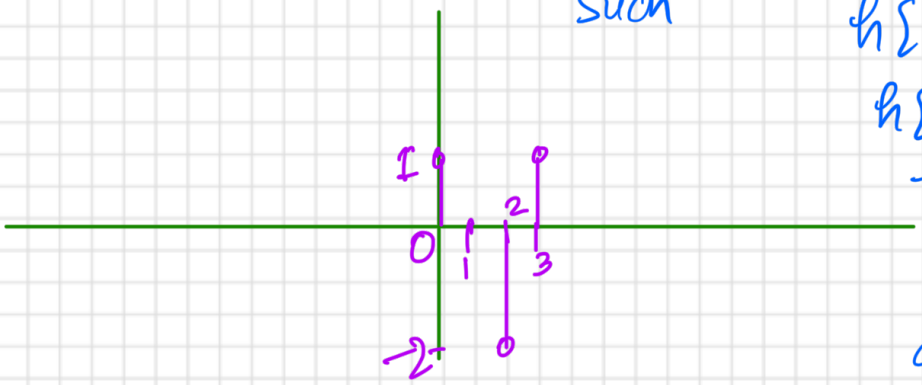
$h[0] = 1$

$h[1] = 0$

$h[2] = -2$

$h[3] = 1$

and rest are zero.



So the system's impulse response eventually goes to zero.

Hence, the system is a finite impulse response or FIR system.