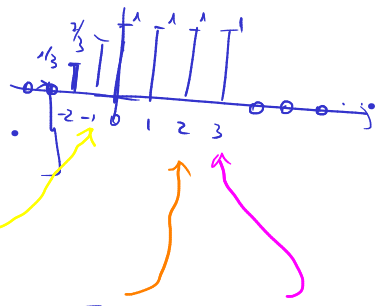


Ex. Week 3

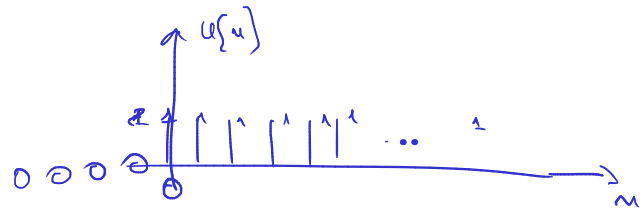
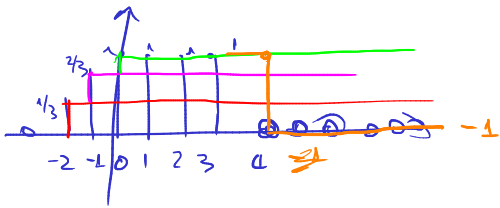
1

$$x[n] = \left\{ \dots 0, \frac{1}{3}, \frac{2}{3}, \frac{1}{3}, 1, 1, 1, 1, 0, \dots \right\}$$



$$a) \quad x[n] = \frac{1}{3} \cdot \delta[n+2] + \frac{2}{3} \cdot \delta[n+1] + \delta[n] + \delta[n-1] + \delta[n-2] + \delta[n-3]$$

$$b) \quad x[n] = \frac{1}{3} \cdot u[n+2] + \frac{1}{3} \cdot u[n+1] + \frac{1}{3} \cdot u[n] \leftarrow u[n-4]$$



$$\delta[n] = u[n] - u[n-1]$$

$$\begin{array}{r} u[n] \quad 000111111 \\ u[n-1] \quad 000011111 \\ \hline \delta[n] \quad 000100000 \end{array}$$

2

$$x_1[n] = \left\{ \dots 0, 1, 2, 3, 4, 0, \dots \right\} = x[n]$$

3 ways

$$x_2[n] = \left\{ \dots 0, 2, 2, 3, 3, 0, \dots \right\} = h[n]$$

A) $\begin{array}{ccccccc} \text{Input} & 1 & & & & & \\ & 2 & & & & & \\ & & 3 & & & & \\ & & & 4 & & & \\ \hline & 1 & 2 & 3 & 4 & \dots & 0 \dots \end{array} \rightarrow \begin{array}{ccccccc} \text{Output} & 2 & 3 & 3 & & & \\ & 4 & 4 & 6 & 6 & & \\ & & 6 & 6 & 9 & 9 & \\ & & & 8 & 8 & 12 & 12 \\ \hline & 0 & 2 & 6 & 13 & 23 & 23 & 21 & 12 & 0 \dots \end{array}$

B) $x[n] = \dots 0, 0, 1, 2, 3, 4, 0, 0, \dots$

$h_{\text{reversed}} = [3, 3, 2, 2]$

$y[n] = \dots$

$y[0] = 0 \cdot 3 + 0 \cdot 3 + 1 \cdot 2 + 2 \cdot 2 = 6$

$y[1] = 0 \cdot 3 + 1 \cdot 3 + 2 \cdot 2 + 3 \cdot 2 = 13$

$y[2] = \dots = 23$

$y[-1] = 2$

$y[-2] = 0$