

$$X[n]X[n-n_0] = \text{---} \mid \begin{array}{c} X[n_0] \delta[n-n_0] \\ \uparrow \end{array}$$

$$X[n_0] = \text{---} \mid \begin{array}{c} X[n_0] \\ \circ \circ \circ \circ \circ \circ \circ \end{array}$$

↳ Constant Function

$$\sum_{n=-\infty}^{\infty} X[n]X[n-n_0] = X[n_0]$$

$$\sum_{k=-\infty}^{\infty} X[k]\delta[k-n_0] = X[n_0]$$

$$\sum_{k=-\infty}^n X[k]\delta[k-n_0] = \begin{cases} X[n_0] & n \geq n_0 \\ 0 & n < n_0 \end{cases} = X[n_0]u[n-n_0]$$

$$\sum_{k=-\infty}^{\infty} X[k]\delta[k-n_0] = X[n_0]$$

$$\sum_{k=-\infty}^{\infty} X[k]\delta[n_0-k] = X[n_0]$$

$$\sum_{k=-\infty}^{\infty} X[k]\delta[n-k] = X[n]$$

MATLAB

→ matrix lab

-- for, while, if --

$$x = 7 + 4i$$

$$y = 2 - 3j$$

$$c = x + y = 9 + i$$

> AND

| OR

~ NOT

>

≥

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=

~=

telda

$$A = [2 \ 3 \ 4 \ , \ -1 \ 5 \ 0] \quad , \quad A = \begin{bmatrix} 2 & 3 & 4 \\ -1 & 5 & 0 \end{bmatrix}$$

$$B = [2 \ 5 \ -3 \ , \ -2 \ 4 \ 6]$$

$$C = A + B = \begin{bmatrix} 4 & 8 & 1 \\ -3 & 9 & 6 \end{bmatrix}$$

$$D = A * B \rightarrow \text{Error}$$

$$A * B$$

$$n \times m \quad m \times v$$

The # Columns =

The # rows

$$D = A \cdot B \quad \begin{bmatrix} 4 & 15 & -12 \\ 2 & 20 & 0 \end{bmatrix}$$

$$A = \text{Zeros}(9, 7) \quad \text{"Full of Zeros"}$$

$$B = \text{Ones}(5, 3) \quad \text{" "}$$

Vectors (uni-dimensional Matrix)

$$x = [1 \ 2 \ 5 \ 0 \ -2] \quad 1 \times 5$$

$$y = [5 \ 4 \ 3 \ -1 \ -5]$$

$$c = x + y = [6 \ 6 \ 8 \ -1 \ -7]$$

$$d = x * y \rightarrow \text{Error}$$

$$d = x \circ * y = [5 \ 8 \ 15 \ 0 \ 10]$$

$$x = [1 \ 2 \ 3 \ 4 \ 5]$$

$$x = 1:5$$

$$* \neq /$$

$$x = [1 \ 2 \ 3 \ 5 \ -7 \ 0 \ 2]$$

$$y = x(3:5) \rightarrow [3 \ 5 \ -7]$$

$$d = x(4:7) \rightarrow [5 \ -7 \ 0 \ 2]$$

expanding a
vector
or shrink it

$$\leftarrow y = [0 \ 1 \ 4 \ -2 \ 3] \rightarrow [0 \ 1 \ 3 \ 5 \ -7 \ -2 \ 3]$$

$$X = [x \ y] = [1 \ 2 \ 3 \ 5 \ 0 \ 1 \ 3 \ 5 \ -7 \ -]$$

$$x = \text{zeros}(1, 10) \rightarrow \text{ten columns of zeros}$$

$$y = \text{ones}(1, 5) \rightarrow [1 \ 1 \ 1 \ 1 \ 1]$$

$$x = 1:0.1:2 \rightarrow [1 \ 1.1 \dots 1.9 \ 2]$$

$$y = \cos(x) \rightarrow [\cos(1) \ \cos(1.1) \dots]$$

$$y = \max(x)$$

$$= \min(x)$$

$$= \text{sum}(x)$$

$$= \text{mean}(x)$$

$$X[n] = 2n$$

$$= 0$$

$$-3 \leq n \leq 3$$

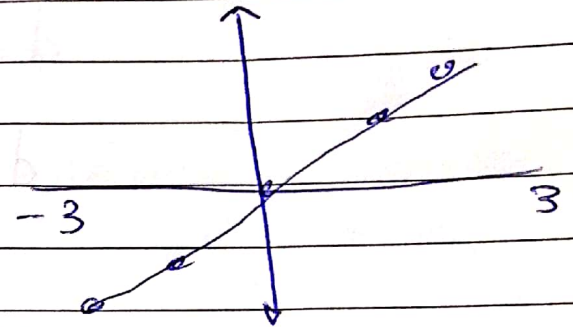
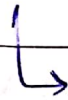
$$\text{otherwise}$$

Q: Write a matlab code to plot $X[n]$ on the screen.

$$n = -3:3$$

$$X = 2 \times n$$

Plot(n, X)



automatically connect the points

~~Step~~ Stem(n, X)

"another instruction that doesn't connect points"

* not the right graph!

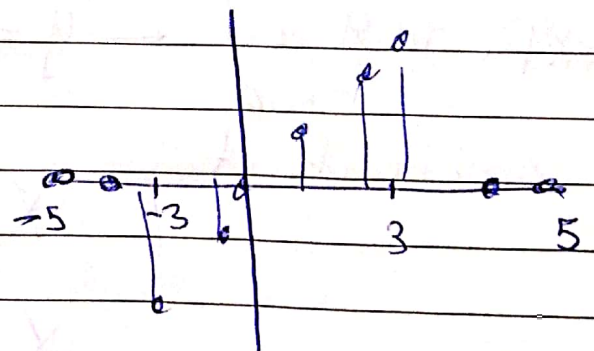
$$n = -3:3$$

$$X = 2 \times n$$

$$X = [0 \ 0 \ 0 \ 0 \ 0]$$

$$n = -5:5$$

stem(n, X)



$$n = -3 : 3$$

$$X = 2 \times n$$

$$y = \text{zeros}(1, 97)$$

$$X = [y \ X \ y]$$

$$n = -100 : 100$$

$$\text{stem}(n, X)$$

