- Midterm 25% - Final 75% 75 % lecture 1

Book :-

- Elementary linear Algebra

- Howard Anton & Chris Rorres

DR. Marwa ? Chapter 1,2,3

11th Edition or 9th

1. Matrices (Matrix)

- operation on Matrices

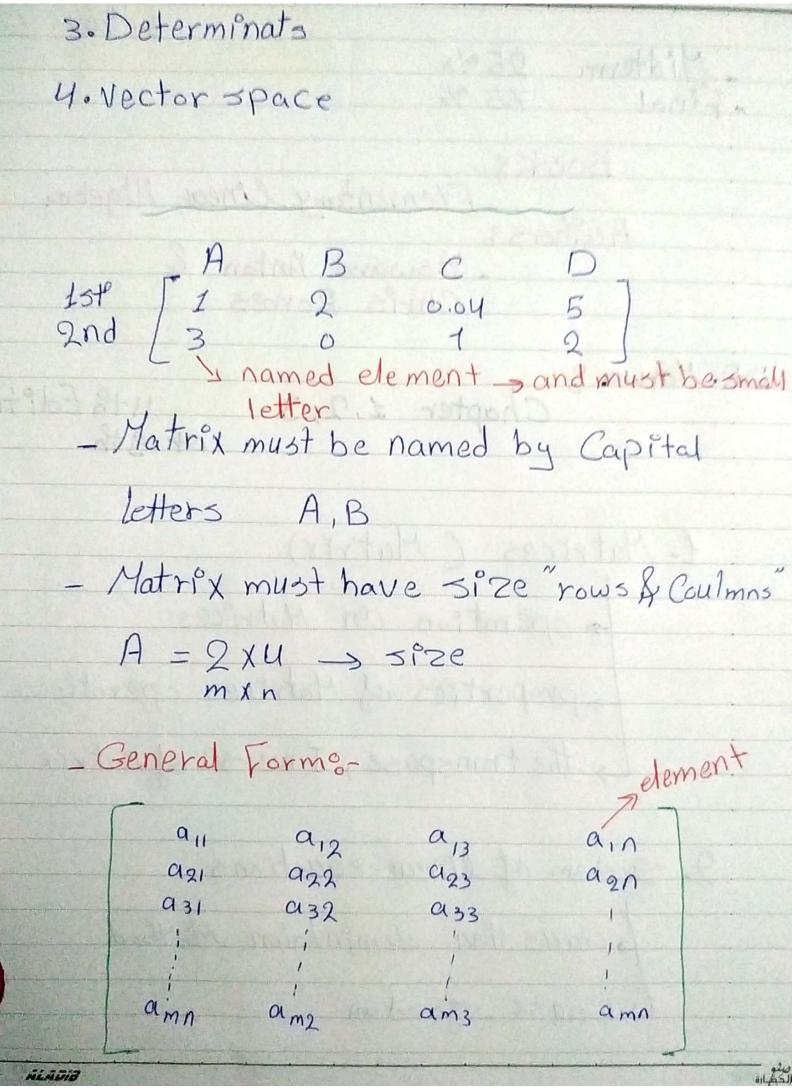
La properties of Matrices operations

> the transpose, Inverse of Matrix

2. System of linear equations

L. Gaussian elemintaion Method

L. Gauss - Jordan



- square Matrix >

$$a_{11} = 2$$
 $a_{12} = 3$

$$a_{21} = 1$$
 $a_{22} = 1$

- square Matrix? is amatrix the rows numbers, are equal Coulmns numbers.

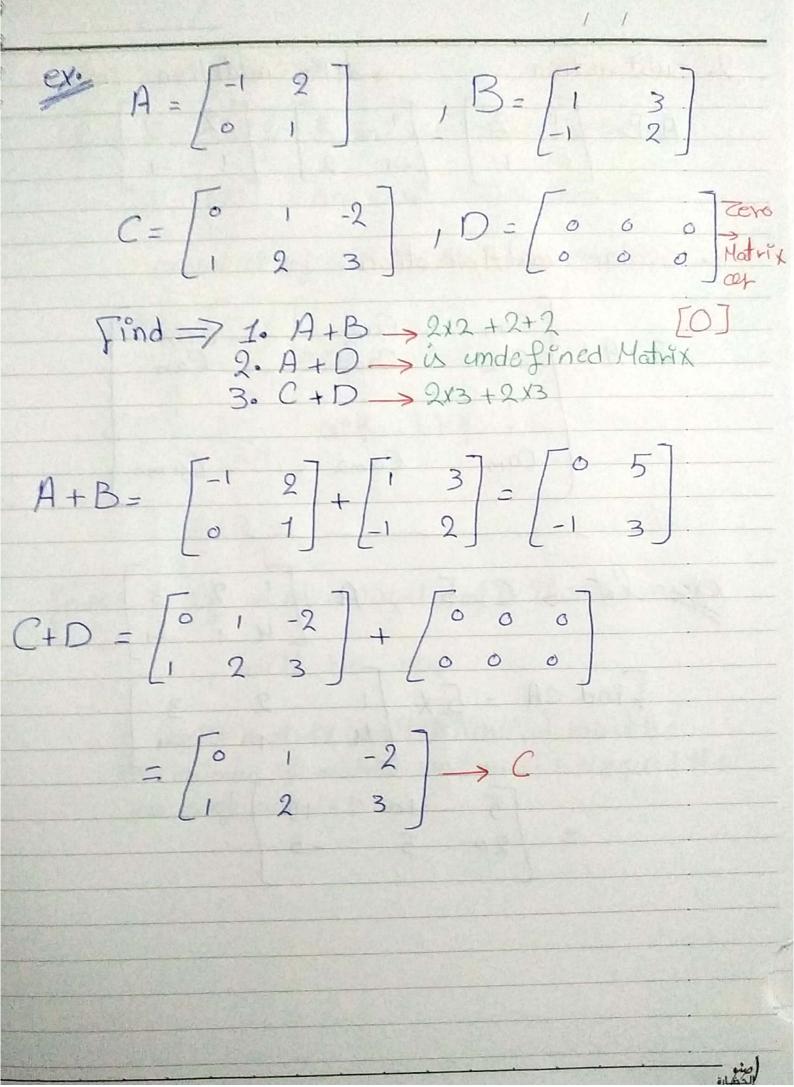
- Rectangle Matrix:
i's amatrix the rows numbers are unequal Coulmns numbers.

-Two Matrices A&B

- are equal if they have the same size and and and Big.

Treasure of News

ex. $A = \begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 1 \\ 0 & 2 \end{bmatrix}$ A &B are equal? No ex. Az[1 2 3], Bz A -> Row Matrox = Row vector -> Coulmns Matrix = Coulmn vector - operations on Matrices :-1. Addition (+) -> if A=[ais] & B=[bis] one matrices of the same size mxn, then their sum is matrix given by [A+B] = [app + bp]



Subtraction
$$\rightarrow$$
 leke addetion
$$A-B = \begin{bmatrix} -1 & 2 \\ 0 & 1 \end{bmatrix} - \begin{bmatrix} 1 & 3 \\ -1 & 2 \end{bmatrix} = \begin{bmatrix} -2 & -1 \\ 1 & -1 \end{bmatrix}$$

3. 5 Calar multiplication

explot
$$\rightarrow C=5$$
, $A\begin{bmatrix} 1 & 2 & 3 \\ 4 & 1 & -1 \end{bmatrix}$

$$= \begin{bmatrix} 5 & 10 & 15 \\ 20 & 5 & -5 \end{bmatrix}$$

4. Hatrex Multiplication

AXB MYN NXP

[notes-] if not a equal not B then the result will be m.p

- to make matrix multiplication must be the Coulmns of matrix one must be equal the rows of matrix + wo.

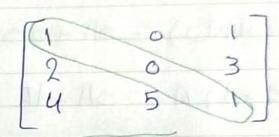
- properties of matrix addition and scalar multiplication

-let A,B, C are mxn matrices f 5,d are scalar

Identy Hatrix => square matrix the Major diameter = 1

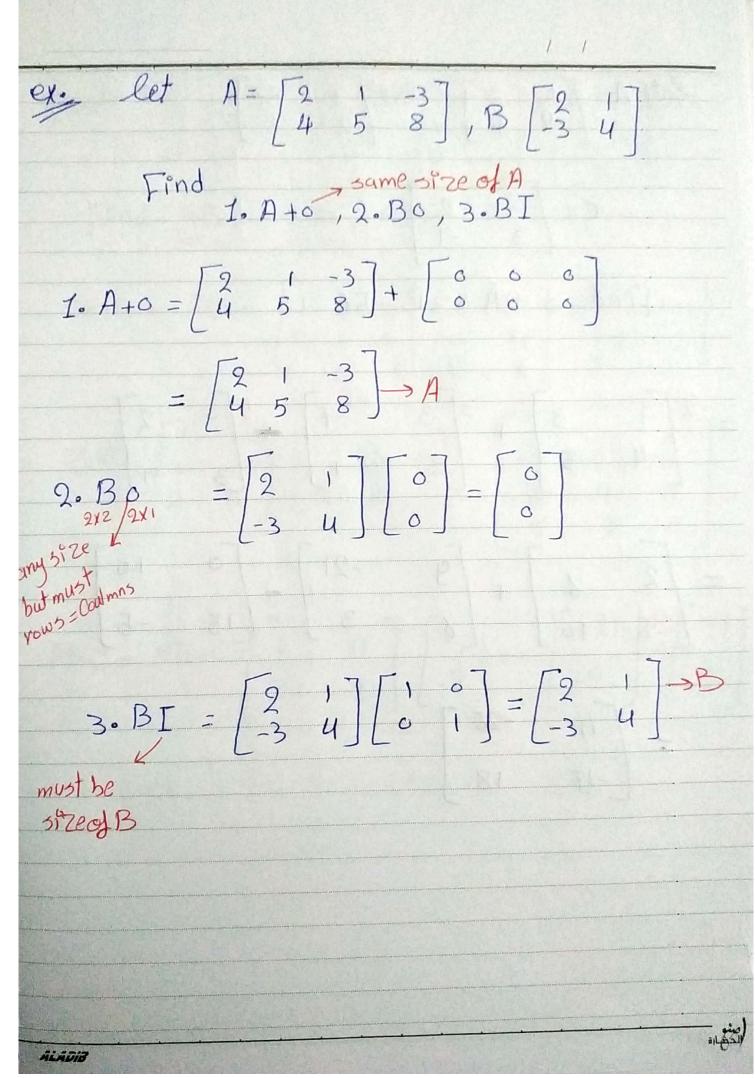
$$I = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$$

Major Diameter & an 1 a22 1 a32



-properties of matrix multiplication

let A,B, c are mxn matrices & s,d are scalars



ex. $A = \begin{bmatrix} 1 & 3 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -1 \end{bmatrix}$, $C = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ Frand AB, BA, ABC 2x3 3x2 3x2 2x3 $BA = \begin{bmatrix} 1 & 1 \\ 0 & 4 \end{bmatrix} \begin{bmatrix} 1 & 3 & 0 \\ 2 & 1 \end{bmatrix} = \begin{bmatrix} -1 & 2 & 0 \\ 2 & 1 & 0 \end{bmatrix} = \begin{bmatrix} -1 & 2 & 0 \\ 8 & 4 & 0 \\ 4 & 7 & 0 \end{bmatrix}$ ABC = AB . C =

Find a, b, c, d such that

$$\begin{bmatrix} a-b & b+c \\ 3d+c & 2a-4d \end{bmatrix} = \begin{bmatrix} 8 & 1 \\ 7 & b \end{bmatrix}$$

$$a-b=8 \rightarrow a=8+b$$

 $b+c=1 \rightarrow c=1-b$
 $3d+c=7 \rightarrow 3d+1-b$
 $2a-4d=6 \rightarrow 2(8+b)-4d$

$$a-b=8$$
 $a-(-3)=8$
 $a+3=8$
 $a=8-3$
 $a=5$

$$C = 1 - b$$

 $C = 1 - (-3)$
 $C = 4$

- Linear unknown power 1
- power of matrices

- properties of matrices powers o-

ex simplify the following matrix expression