Diagonaliting a matrix STAS= A Power's of A equation Ux41 = AUx

- tadoqueses & entounesis at brift at in 1000 4
- Mow after we found them what do we do with thom, The good way to see that is diagonalize the materix. diagonalize materix

S = eigen vector matrix

There is St, mean's we have

to be able to invert eigenvector

malsix = we need n independent

eigenvalues.

=) Suppose we have n independent

eigenvectoris. Pot them in coloumn's

AS= A x, x21. xn

= Axi Axz . . Axn

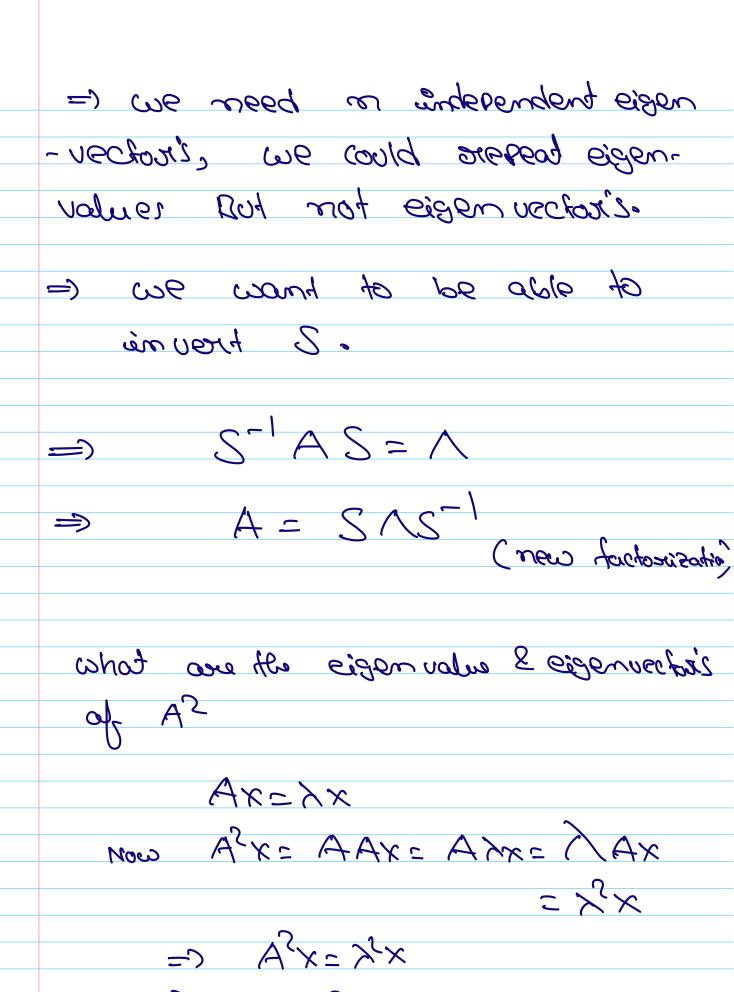
= | >1x1 yx5 ... yxxv

= x, x, x, x,

=) AS= SA

=> S-1AS=1 on A= SNS-1

1 = diagonal eigen value 15



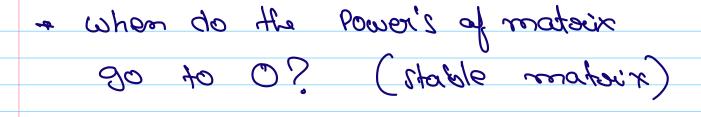
=> A? has 2 eigenvolus or as eigenverter

=) Gisen nome af 4, one ys

$$A^{2} = S \wedge S^{-1} S \wedge S^{-1}$$

$$= S \wedge T \wedge S^{-1}$$

- suit charses and earlier regis the after the court of the court of charter of charge of the charter of charge of
- af resaterix.



 $A^{\vee} \longrightarrow 0 \longrightarrow \wedge$

=) all eigenvalue's have to be [>: | less than 1

redis alore eigenvalue c'igenvector opproach need's n interendent eigen-

Which reafsites ou diagonalizable?

A û sosa to have or independed
eigenvector's (and be diagonalitable)
if all the son it was different.

(No Repeated egen value)

Ex. $A = \begin{bmatrix} 2 & 1 \\ 0 & 2 \end{bmatrix}$ $det(A-xI) = \begin{bmatrix} 2-x & 1 \\ 0 & 2-x \end{bmatrix}$

7= 515

 $A - \lambda I = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix} \quad \forall_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$

we don't have emough essen value!.

=> cue commot diagonalizable.

1st order différence egn

Equation: Ux+1 = AUx

Stood with given vector Vo

01 = AU0

U2 = AU1 = A2U0

02 = AU2 = A300

Ou= AKOO

To really solve Uz= A'CO

Cigen vectors?

no= C1X1+ (5x5+..+Cuxu

AU0= C121x1+C222x2+..+Cn2nxn

OK = AKOO= CIXIX14 (272X24 ... +Cn/2/2xn

How fort one the Fibonock: numberis mi soil reward att opinional egen values

Fresh + Fre Ore = Fresh

 $A = \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} = A - \lambda I = \begin{bmatrix} 1 - \lambda & 1 \\ 1 & -\lambda \end{bmatrix}$

=) y₁-y -1=0 =) y= 17<u>7</u>

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