1	4 -	
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0			
Characteristics	A		^
Eigen values	-	and	Eigenvecturs.
O'Jone Prince	0	una	agair reas-

Let A be $n \times n$ matrix. Then, a non-zero vector \vec{u} is an eigenvector of A, if there exists a scalar λ such that $A\vec{u} = \lambda\vec{u} - (i)$.

The scalar 1 is said to be eigenvalue of corresponding eigenvector u.

From (i), we can write, $A \vec{u} - \lambda \vec{u} = 0$ $A \vec{u} - \lambda \vec{l} = 0$ $A \vec{u} + \lambda \vec{l} = 0$ Since $\vec{u} \neq 0$. So,

This is characteristic quation of mortist A.

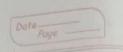
eigenspace:

If A is an nxn matrix with an

eigenvalue I, then the cet of all eigenvectors together

with the zero vector is subspace of I. This

subspace is called eigenspace of I.



(R)! Find the eigenvalue and corresponding eigenspace of the matrix!

aiven, $A = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & 3 \end{bmatrix}$

The characteristic equation of matrix A is,

		1	D		1	0	0	
or,	10	0	91	1-	0	X	0	= 0
-	10	-2	3	1	D	0	1	4

We know!

$$\lambda^3 - \int Sum g \qquad \qquad \begin{cases} \chi^2 + \int Sum g \, diagonal \\ \chi - |A| = 0 \end{cases}$$

or
$$\lambda^3 - 4\lambda^2 + 5\lambda - 2 = 0$$

... $\lambda = 1, 2$

For 1=1, the eigenspace,

$$(A - \lambda I) \vec{z} = 0$$

or
$$\begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & -1 & 1 & 0 \\ 0 & -2 & -4 & 0 \end{bmatrix}$$
 $\begin{bmatrix} n_1 \\ n_2 \\ n_3 \end{bmatrix} = 0$

The augmented matrix,

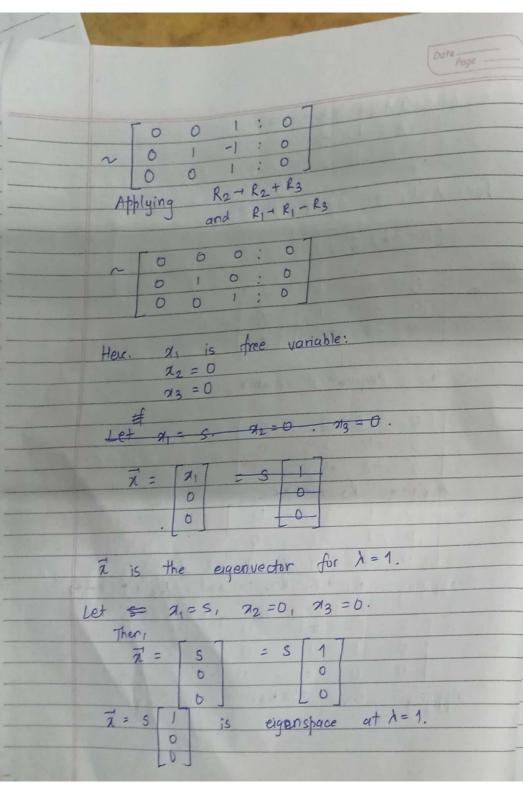
0		0	:	0	-
0	-1	-		O	
0	-2	-4	1	0	

Applying $R_2 - 1 \times R_2$ $\sim 0 \cdot 1 \cdot 0 \cdot 0$ $0 \cdot 1 \cdot -1 \cdot 0$ $0 \cdot 2 \cdot -4 \cdot 0$

Applying RI + RI-R2 and R3 + R3 + 2R2

n 0 0 0 1 : 0 0 1 -1 : 0 0 0 -6 : 0

Applying R3 -1-1/6 R3.



for	λ=2,							
10-	()							
	(A-X	I) 2 =	D					
	()	-),-						
25.	T-1	1	D	71	211	7		
011	0	-2	1	1	72 8	=	D	
	0 0	-2	- 5	11	213			
				16		1		
4	The	augm	ented	ma	trix	is.		
	[-I	1	0	:	0	7		
	0	-2	5	:	0			
	0	-2	-5	:	0	1		
1				7 7	25			
Applying	R ₁ -	7 -1x	RA					
ppy								
~	0	-1	0	2	D		18	
	0	-2	1	-	0			
	0	-2	-5	2	0		- 20	
Applying	R ₂	I	12 x R2			HAN	Wife.	
· ·								
2	1	-1	0	:	0	hand.		النسا
	0	1	-1/2	:	0			
L	0	-2	-5	:	0			
								- 0
pplying	R1	+ Rq	+ R2			K3 7	R3 +	2 1
0								

The eigenspace is $\vec{n} = 5$ 0