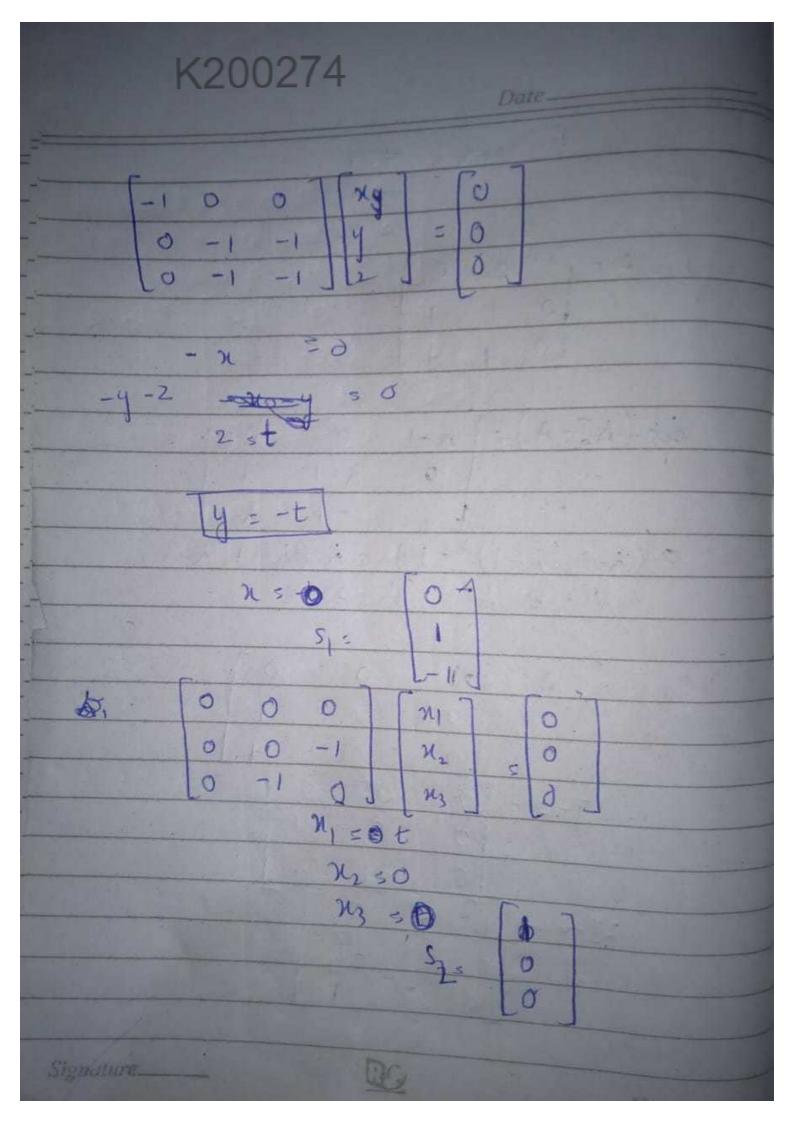
Date
Assignment #04
Ex 5.2!
Am 8) A = [1 0 0]
0 1 1
det (NJ-A)= [h-1 0 0]
0 h-1 -1
[Lo -1 h-1]
= (1-1)(1-1)2-1) = 1 (1-1)(1-2)
Asa Asl A=2
- 1 [1
- A = -1 0 0
0 -1 -1
T-A= [0 0 0]
0 0 -1
0-10
2J-A=1 [1 0 0]
0 1 -1
0-11



K20	0274		Da	ite—
Amio) A = [(9) A - 15 = [3- Dut (A - 15)	2-1		1	
- det (hS-A)	£ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	0	0	= (1-3)(h-2)2
has 2 eig 2 and 3	en values	colth.	Algebri	e multipliety.
(b) 2 I-A =	1 0	9 0	rank (2J-A) 52.
A-76	0 0	0 1 0 1)=2
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(c) geometric multiplicty of h=3 is 3-2=1 equal to algebric multplicity. However, granetice multiplicity of eigen value h=2 is 3-251, which is less then the corresponding algebra multipurty. (2), therefore by theorem A is not dougonalizable.

Amisa) (L-1)(L+3)(L-5)=0

A=1, h= -3, h=5

and all of them have algebric multipusible.

Since A is 3×3 with 3 distinct eigen values it follows from Theorem that it diagonizable.

> geometric multiplicky = Al Jebric Multipuloy

12(1-1)(1-2)3=0

1 =0,1,2.

1:0 Atgebric mult plicty = 2,

A=1 Algebric multiplicity=1

A=2 Algebric multiplicity=3

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dim	$A_1 = 1$ $A_2 = 4523$ of this equatron are (igen.
As PDP D= P-1A	P	
1	-2 8] [1] 9 -1 0 1 0 0 -1 [0]	$\begin{bmatrix} -1 \\ 5 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$
	1 -2 8 1	J = [4] = 4] = 4] = 1 = 4] = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 = 1 =
Signature	0 -1	0 = [0]

	Date
P-1=	
A=PP	
PDP	-1 1 -4 1 -1 0 0 1 0 0 0 -1 0 0 1 0 0 0 1
	0 1 0 1
A =	[1-28]
	0 0 -1
A110 00	P D 1000 P-1
-	1000

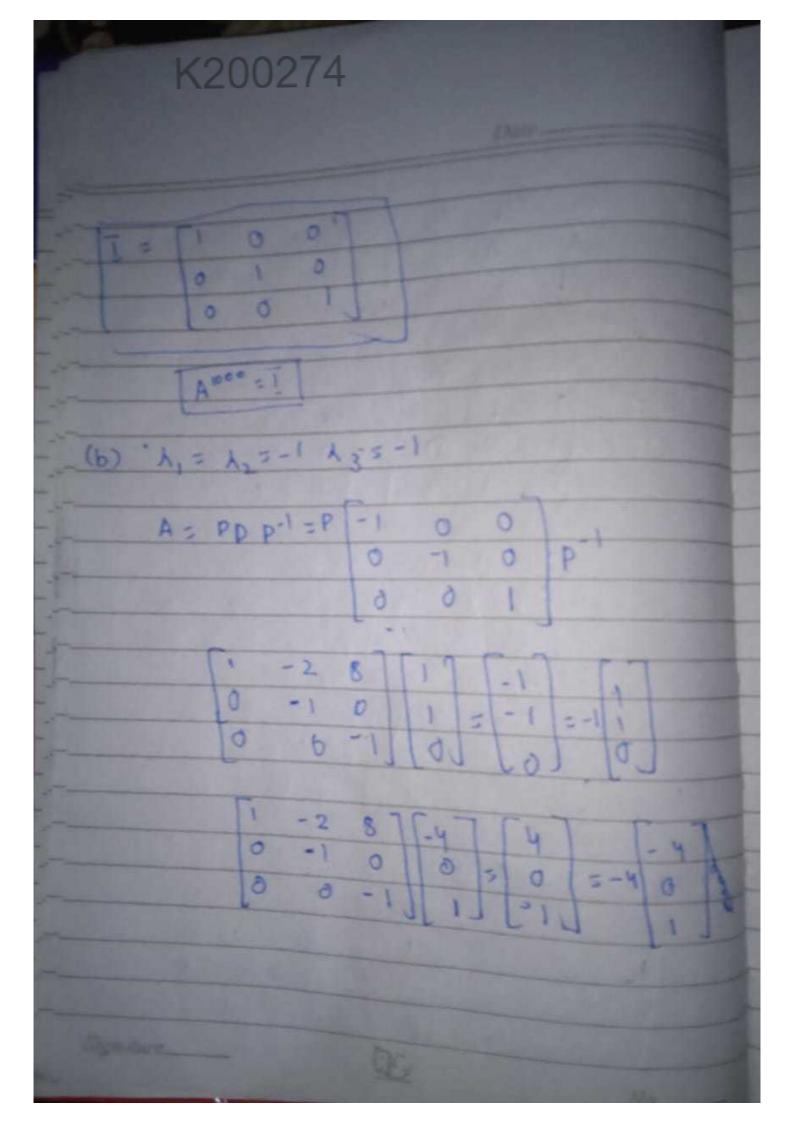
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0 7

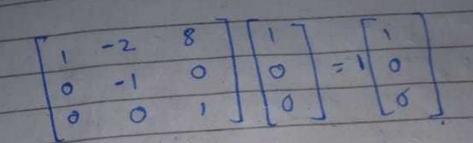
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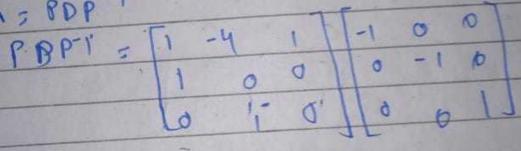
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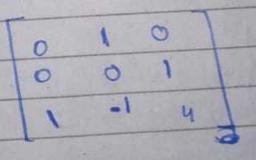






A ; PDP



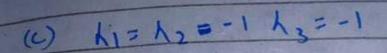


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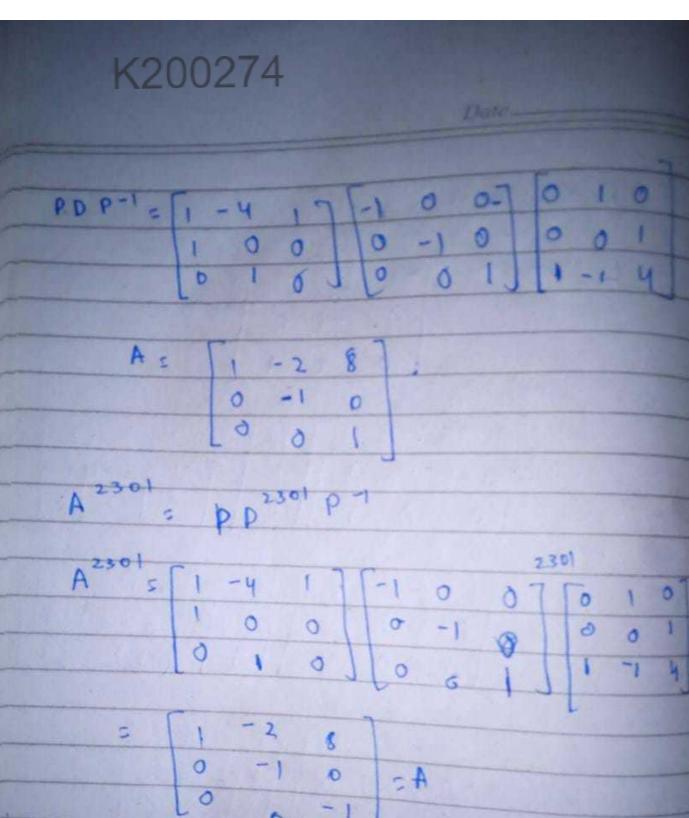
							_	-			
T	1	-2	8]	1	17		1	-1		1	
1	0	-1	0		1	=	:	-1	2 -1	1	
	0	6	-1	1	10	1		6	1	10	1
_			The state of the s	-							110

	1	- 2	8	1	-47	-	47		-47	
	6	-1	0		0	5	0	= 1	0	
1	lo	0	-1	T	1.1	1	1-1		[1	

1	1	- 2,		87	1	11			
	0	-	1	0		0	1=1	0	
	0		0	-1	1	10	1	10	

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2	1	- 2	8	
	0	-1	0	-A
	10	0	-1	

A 2301



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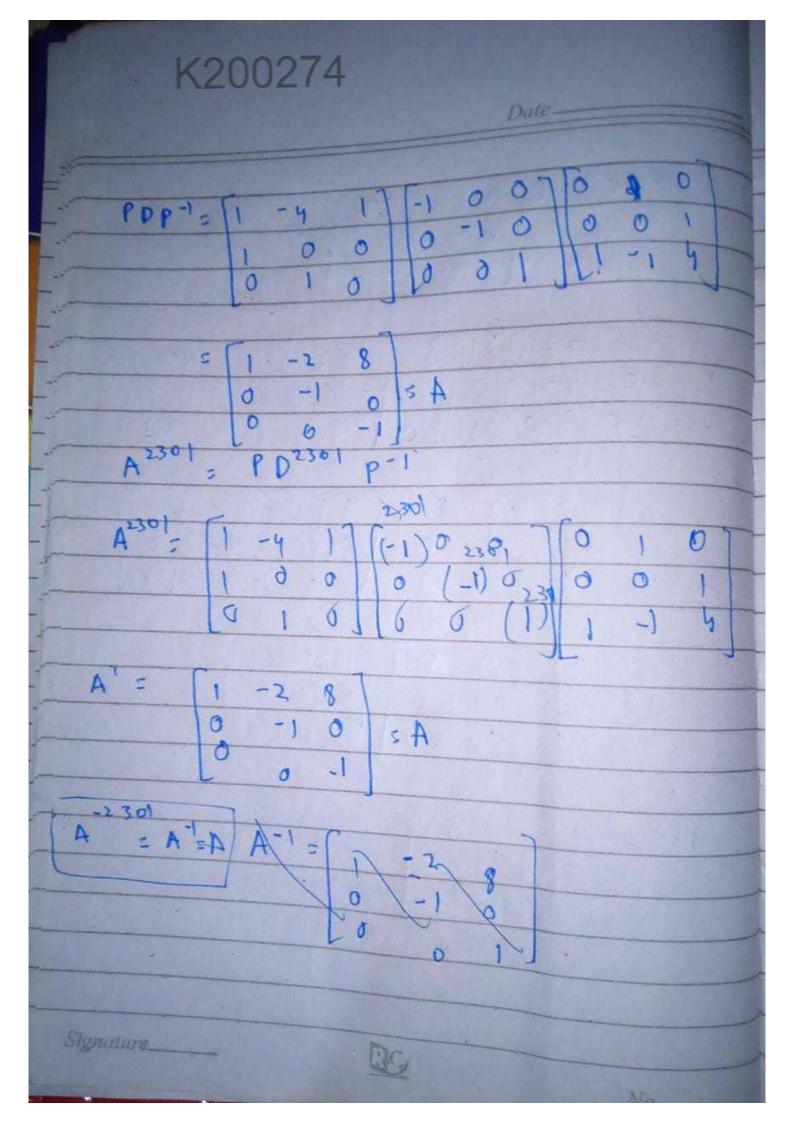
(d)
$$A = PDP^{-1} = P[-1 \ 0 \ 0]$$

$$\begin{bmatrix} 1 & -2 & 8 & 1 \\ 0 & -1 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix} = \begin{bmatrix} -1 \\ 0 \end{bmatrix} = -1 \begin{bmatrix} 1 \\ 0 \end{bmatrix}$$

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(v,v)=1 .1.3+5.1.2

(U,V)= 3+10

 $(v,v) = \frac{23}{2}$

(b) (Kv, w) = 1 (Kv,)w1 + 5 (Kv,) w2.

(K v, w) = 1 (3.3).0 + 5(3.2) (-1)

(XV, W) = 0+ (-30)

(Ku, w) = -30

(a) (v+ v, w) = 1 (v,+v,) w1 +5(v,+v2) w2.

(U+ 1, w) = 1 (1+3) , 0 + 5 (1+2) (-1)

(N+V, W) =-15

0

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$$(f) \quad U-KV = (1,1)-3(3,2)$$

$$U-KV = (1,1)-(91,6)$$

$$U-KV = (-8,-5)$$

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a sa makeup

d(u,v) = 114-v11 d(u,v) = 11(-8,-5)11

 $\frac{d(u,v)=\int_{-1}^{1} (-8.(-8))+5(-5.(-5))}{2}$ $\frac{d(u,v)=\sqrt{157}}{2}$

Ansis) U=(U11U2) ER2 V=(V,)U2) ER2

LU, V) 5 (1 U1 V1+ C2 V2 V2

Ja O Jaz

Matrix of weighted inner product =

[0 13]

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Ans 15) { $p(x_0) = p(-2) = -2 + (-2)^3 = -2 - 8 = +0$ $p(x_1) = p(-1) = -1 + (-1)^3 = -1 - 1 = -2$ $p(x_2) = p(0) = 0 + 0^3 \pm 0 + 0 = 0$ $p(x_3) = p(0) = 0 + 0^3 \pm 0 + 0 = 0$ $p(x_3) = p(0) = 1 + 1^3 = 1 + 1 = 2$ $p(x_3) = p(1) = 1 + 1^3 = 1 + 1 = 2$ $q(x_1) = q(-1) = 1 + (-1)^2 = 1 + 1 = 2$ $q(x_2) = q(0) = 1 + 0^2 = 1$ $q(x_3) = q(1) = 1 + 1^2 = 2$

inner product on p3 "

cp, qo = p(010) q(x0) + p(x1) (p(x1) + p(x2) q(x2) + p(x3) q(x3)

= -10(5) + (-2)(2) + (0)(1) + (2)(2) = -50 -4 + 0 + 4 = -50

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A ms22) ZUSV>=Er(UTV) =U,V, +U,V2

Cu, w>= 12+22+(-3)2+52=1

11U11= 539 and 2(U, U) 543

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Ans 26) 20,0> = (AU) . (AU)

$$= \left(\begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix} \begin{bmatrix} -1 \\ 2 \end{bmatrix} \right) \left(\begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix} \begin{bmatrix} -1 \\ 2 \end{bmatrix} \right)$$

$$\frac{\langle v-v_{3}v-v_{3}=(A(v-v))\cdot(A(v-v))}{=\left(\begin{bmatrix} 1 & 2 & [-3] \\ -1 & 3 & [-3] \end{pmatrix})\left(\begin{bmatrix} 1 & 2 & [-3] \\ -1 & 3 & [-3] \end{pmatrix}\right)}$$

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```
Ans 28)(0) 40-V-2W, 40+V)
    = 420,4> + 20,07 - 420,07 - Cv,07
    -8 (w, u) - 2 (w, v)
    = 4110112 + 2-4 20, V> - 110112-8[U,W)
     - 22V, w)
    = 4 + 2 -4 (2) -22 -8(-3) -2(-4)
      4+2-8-4+24+12.
      3 30.
      LU-V-2w, 44+V)=30
(b) 12w-V11 = 1 < 2w-V, 2w-V)
          = 1.42w, w> -22w, v>-2Lv, w>
         5 14 11W112-2LV, w>-2LV, w>+
          11V11 2.
       = 14(1)2-2(-6)-2(-6) +22.
           1 196 + 12 + 12 + 19
     = 1224
    11200-41 = 1224
```

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Ex 602:

Ans 2) pr) U= (-1,0) V= (3,8).

COSD = U.V = (-1) 3+0 HULL HULL JCD2+0243.

= 3 \ \frac{73}{73}

Coso- 3√13

Ansy) p= x-n2 · q= 7+3x2.

 $\cos \theta = 0.1 + 1.3 + (-1).3$ $\sqrt{0^2 + 1^2 + (-1)^2} \sqrt{12 + 3^2 + 3^2}$

5 0 50 V2 V67

1120021
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Ansb) A = [2 4 B = [-3 1]
[-1 3] [4 2]
COSB = (A)B> = 2.(-3)+4.1+(-1)4+3.2
11A11 [18] 122+42+(-1)2+32 J(-3)+1442+12
= 0
Cox0 =0
Ans 8) a) U = (U, 10, 10, 10) V=(0,0,0).
20,0>=0,0+0,0+0,0=0.
Orthogonal
(b) (-4,6,-10,1) V=(2,1,-2,9).
(U,V)=(-4).2+6.1+(-10).(-2)+1A=00 27
not orthogonal
(c) U=(a,b,c) V=(-(,0,4)
(v, v) = q.(-c) + b.0 + c. q = -qc+0 +qc=0.
Oxth 1
Orthogonell.

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Ans 12) 4=	5	-17	V=	1 3
	2	-2		[-1 0]
<u,v></u,v>	= 501	+(-1	103	+ 2(-1) (2)0

orthogonal.

Ans 18)
$$< u_3 v_3 = (Aq) \circ (Av)$$

$$= (\begin{bmatrix} 2 & 1 \end{bmatrix} \begin{bmatrix} 3 & 1 \end{bmatrix} (\begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 3 & 1 \end{bmatrix}) \begin{bmatrix} 2 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 3 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 9 & 1 & 2 \\ 6 & 1 & -3 \end{bmatrix} = 9(2) + 6(3) = 0$$

ortho go now

(AU) (AU)=0