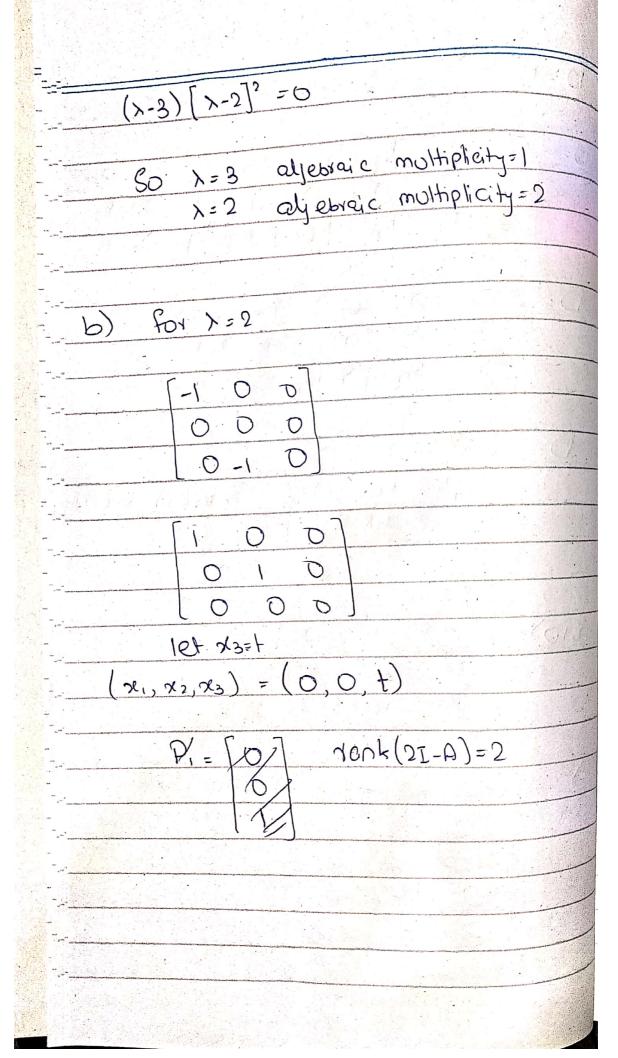
| # |
|---|
| AGSignment #3 Linear Aljebra |
| Dame: Hameez Ahmed Siddiqui |
| Rall. Do: 20k-0242 |
| Gection: BCS-3B |
| Instructor: Sir Osama Antuley. |
| 7 |
| Ex5.2 Q8,10,15,20 |
| Ex61 Q2,13,15,22,26 \$ 26 |
| Ex#6.2 Q2,4,6,8,12818 |
| |
| Ex#5.2 |
| |
| Q.8) A= 100 |
| 0 1 1 |
| |
| |
| det(xI-A)=0 |
| |
| [>-100] |
| Ο. λ-1 -1 |
| 0 -1 >-1 |
| |
| $(\lambda - 1) [(\lambda - 1)^2 - 1] = 0$ |
| $(+ \times -1)^3 - (-1)$ |
| $(\lambda - 1) [\lambda^2 - 2 + 1 - 1] = 0$ |
| $(\lambda - 1) \left[\lambda \left(\lambda - 2 \right) \right] = 0$ |
| |
| |

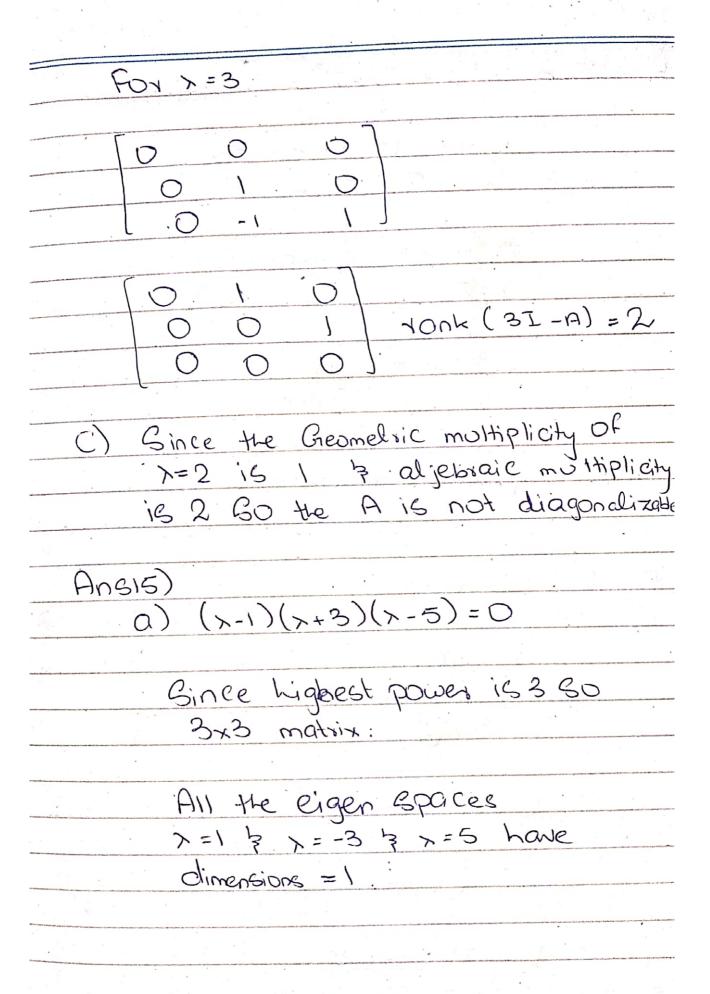
| >(>-1)(>-2)=0 |
|---|
| |
| 7=0,1,2 |
| For |
| >> |
| |
| +1 0 0 0 +1 +1 |
| O +1 +1] |
| |
| R3-R3[1 0 0] |
| |
| 1000 |
| let x3=t |
| |
| $(\alpha_1, \alpha_2, \alpha_3) = (0, -t, t) = t(0, -1, 1)$ |
| |
| P, = 0 |
| 1 4 |
| |
| |
| |
| |
| |
| |

| For $\lambda=1$ |
|---|
| $ \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & +1 \\ 0 & +1 & 0 \end{bmatrix} $ |
| let x,=8 |
| $(x_1, x_2, x_3) = (6, 0, 0) = 6(1, 0, 0)$ |
| P2= [1] |
| [0] |
| Por $\lambda = 2$ |
| |
| $\begin{array}{c ccccccccccccccccccccccccccccccccccc$ |
| 1et 23=t |

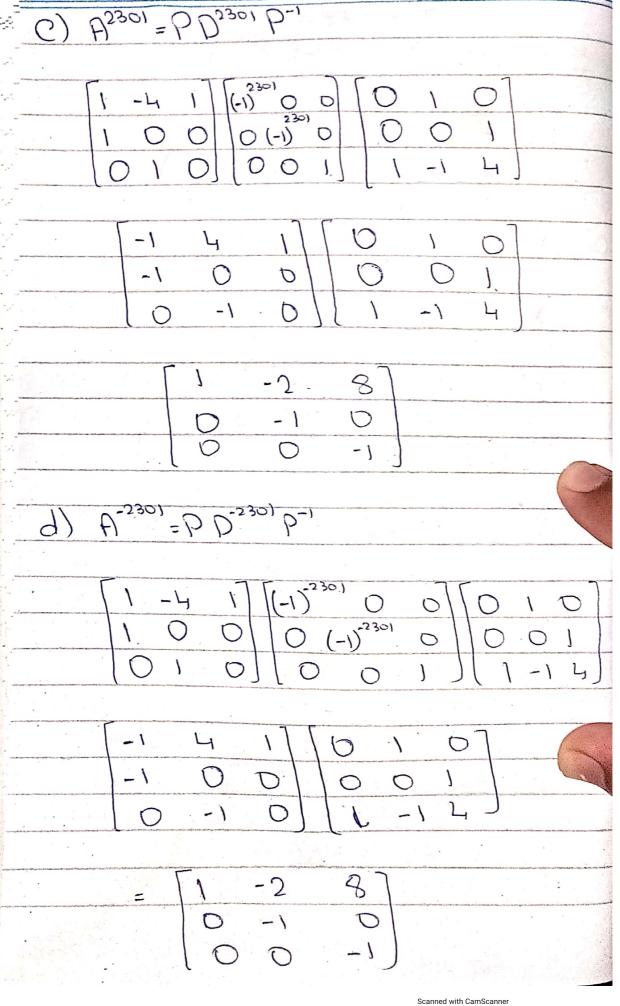
| | $(x_1, x_2, x_3) = (0, t, t) = t(0, 1, 1)$ | |
|--|--|-------|
| | P3=[0] | |
| The second secon | | |
| | So P= [0 1 0] -1 0 1 | |
| The second secon | [101] | |
| The process of the control of the co | D=PAP" | |
| The state of the s | D= [0 1 0] [1 0 0] [0 -1/2 -1 0 1 0 1 1 0 1 0 1 1 0 1/2 | 1/2 0 |
| | $D = \begin{bmatrix} 0 & 0 & 1 & 1 \\ -1 & 1 & 1 \end{bmatrix} \begin{bmatrix} 0 & -1 & 1/2 \\ 1 & 0 & 0 \\ 0 & 1/2 & 1/2 \end{bmatrix}$ | |
| And the second s | D = | |
| | | |

= P-, Ub 1/2 -112 Q 0 1/2 1/2 Aca O So tr(A) = tr(D Arsio) det (>I-A)=0 >-3





| Ano15.6) x2(x-1)(x-2)3 = 0 |
|---|
| |
| Since the highest power is |
| 6 Go 6x6 matrix. |
| |
| possible dimension for |
| 7=0 Can be 0,1,2 |
| |
| possible dimension for |
|)=1 most be 1 |
| |
| Possible dimension for |
| $\lambda=2$ must be 1, 2, 3 |
| |
| Ans20) D=P"AP |
| |
| D= [0 1 0] [1 -2 8][1 -4 1] |
| 001/0-10/109 |
| |
| [1-14][00-1][010] |
| [1-14][00-1][010] |
| D= [0 -1 0] [1 -4] |
| D= [0 -1 0] [1 -4 1] 0 0 -1 1 0 0 |
| D= [0 -1 0] [1 -4] 0 0 -1 1 0 0 1 -1 4] [0 1 0] |
| D= [0 -1 0] 1 -4 1 0 0 -1 1 0 0 1 -1 4 1 0 1 0 |
| $D = \begin{bmatrix} 0 & -1 & 0 & 0 & -1 \\ 0 & 0 & -1 & 1 \\ 0 & 0 & -1 & 1 & 0 \\ 1 & -1 & 4 & 0 & 1 & 0 \end{bmatrix}$ $D = \begin{bmatrix} -1 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ |
| $D = \begin{bmatrix} 0 & -1 & 0 \\ 1 & -1 & 1 \\ 0 & 0 & -1 \\ 1 & -1 & 4 \end{bmatrix} \begin{bmatrix} 0 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & -1 & 0 \end{bmatrix}$ $D = \begin{bmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 0 \end{bmatrix}$ |



| E | メギ | 6. |) |
|---|----|----|---|
| , | 1 | | |

Ans2)

a)
$$40,47 = \frac{1}{2}(3) + 5(2) = \frac{3}{2} + 10 = \frac{23}{2}$$

C)
$$40+4, 47 = \frac{1}{2}(4)(0) + 5(3)(-1) = -15$$

$$=\sqrt{32+125}$$
 $=\sqrt{157}$

| Anoi3) [53 0] |
|---|
| 0 55 |
| |
| |
| Anois) P=2+x3 |
| $Q = 1 + \chi^2$ |
| |
| $\chi_0 = -2, \chi_1 = -1, \chi_2 = 0, \chi_3 = 1$ |
| $\langle P, q \rangle =$ |
| P(-2)q(-2) + P(-1)q(-1) + P(0)q(0) +P(1)q(1) |
| |
| (-10)(5)+(-2)(2)+0+4 |
| |
| -50-4+4 |
| $\langle P,q,\rangle = -50$ |
| |
| An622) |
| |
| 11011 = 11+4+9+25 = 539 |
| |
| $d(0-v) = \sqrt{(-3)^2 + (-4)^2 + (-3)^2 + (-3)^2}$ |
| 04U-V) = V(|
| d(U-V)=19+16+9+9 |
| d(U-V) = V 1771 |
| |

Ans26) 11011 = 1 (3)2 + 72 = 1 658 = 558 0(0,1)=1(-9)2+(-6)2=181-36=1117=353 Ans 28.a) (U-V-2W, 40+V7 = (U, 40+V7- (V, 40+V7.- (2W, 40+V7 = くし、407+くし、イン・イン、107-イノ、イン・イクル、407 - (2W, Y> = 4 (0, 07 - 40, 77 - 447, 07 - 47, 77 -5 (w, w) -2 (w,v) =4110112 + -3 (V, U) - 11V112 -8 (U, W) -2 (V, W) = 4(1)-3(2)-(4)-8(-3)-2(-6) = LA - 6 - KH + 24 + 12 30 b) 112W-VII =1<2m-1, 2m-1> = 1(2m, 2m-1) - (1, 2m-1) = 7504,247-524,47-54,247+64,47 = 14 < W, W7 - 2 < W, V7 - 2 < V, W7 + 2 V, V7 = 1411W112 -4 LV, W7 + 11V112

= 54(49)-4(-6)+4 = \$224

Ex#6.2

Ansy)
$$\cos\theta = (0)(7) + (1)(3) + (-1)(3)$$

$$\sqrt{2} \sqrt{49+9+9}$$

Ans6) Cos9 = -6+4-4-6 =0 Ans8.a) (U, V) = U, (0) + U2 (0) + U3 (0) = 0 Go oxtrogonal b) (0, 47 = (-4)(2) + (6)(1) + (-10)(-2) + (1)(9) <u>

⟨U, ∨⟩ = -8 +6 +20 +9 =27 ≠0. So not orthogonal C) LU, V7 = -e1C+b(0) + C(a) = -ac +ac =0 So orthogonal. Ans12) (U, V7= (5)(1)-1)(3) +2(-1) -2(0) = 5 -3 -2 =0 So Otthogonal. Ansis) [2 1] [3] . [2 1] 5 $= \begin{bmatrix} 9 \\ 6 \end{bmatrix}, \begin{bmatrix} 2 \\ -3 \end{bmatrix} = 18 - 18 = 0$