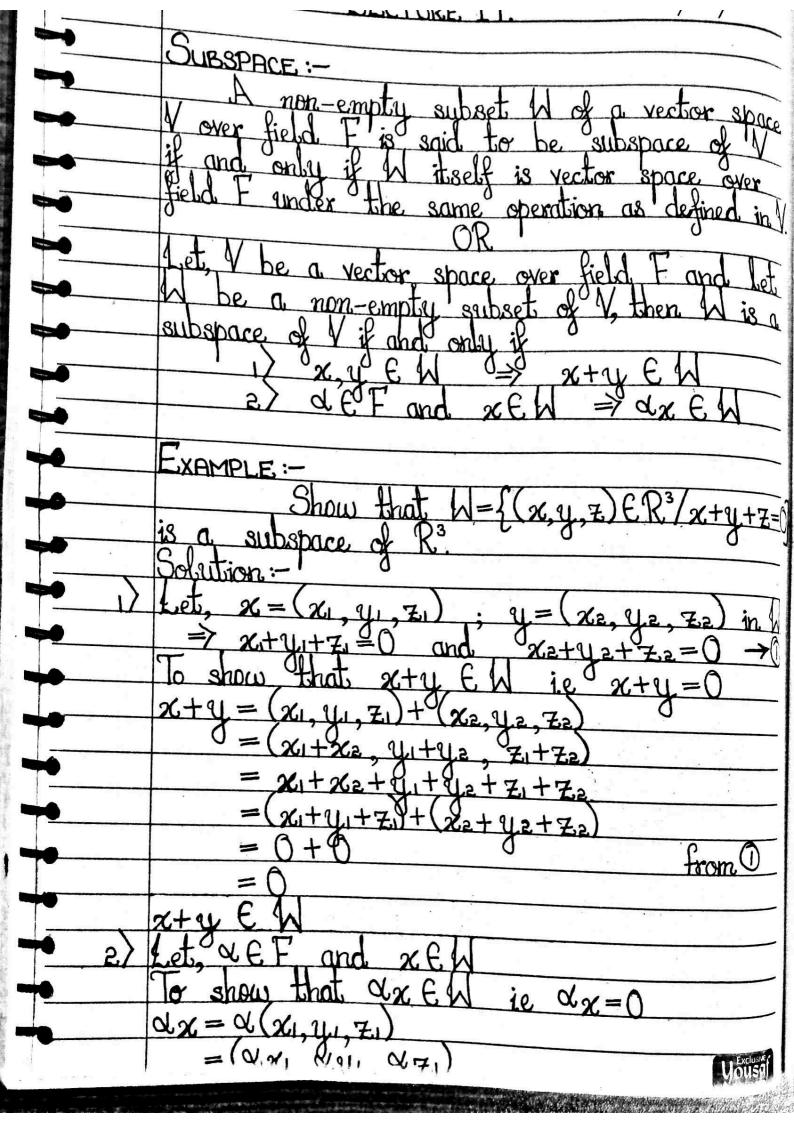
Linear Algebra (Week 14-18(December) Lecture 1



= \(\chi_{1} + \alpha_{1} + \alpha_{2} \) = \(\alpha_{1} + \alpha_{1} + \alpha_{2} \) = \(\alpha_{2} + \alpha_{1} + \alpha_{2} + \alpha	Day:	Date: / /
= \(\lambda (\chi + \frac{1}{2} \right) \) = \(\lambda (0) \) \(\text{Therefore}, \text{ is a subspace of } \text{R}^3. \) \(\text{Example: -} \) \(\text{Show that } \text{M=\left(\chi, \chi, \chi) \chi \text{R}^3 \chi \chi \chi \chi \chi \chi \chi \chi		$= \alpha_{x_1} + \alpha_{y_1} + \alpha_{z_1}$
Therefore, W is a subspace of R3 EXAMPLE: Show that W=\((x,y,\frac{1}{2}\) \cdot \((R^3/x+y+z=1)\) is not a subspace of \(R^3/x+y+z=1)\) Solution: Let, \(x = (x_1, y_1, \frac{1}{2})\); \(y = (x_2, y_2, \frac{1}{2})\) in \(1)\) \(\frac{1}{2}\) \(x = (x_1, y_1, \frac{1}{2})\); \(y = (x_2, y_2, \frac{1}{2})\) in \(1)\) \(\frac{1}{2}\) \(x = (x_1, y_1, \frac{1}{2})\); \(y = (x_2, y_2, \frac{1}{2})\) in \(1)\) \(\frac{1}{2}\) \(x = (x_1, y_1, \frac{1}{2})\) + \((x_2, y_2, \frac{1}{2})\) \(= (x_1 + x_2, y_1 + y_2, \frac{1}{2} + \frac{1}{2})\) \(= (x_1 + x_2, y_1 + y_2, \frac{1}{2} + \frac{1}{2})\) \(= (x_1 + x_2, y_1 + y_2, \frac{1}{2} + \frac{1}{2})\) \(= (x_1 + y_1 + \frac{1}{2})\) + \((x_2 + y_2 + \frac{1}{2})\) \(= (x_1 + y_1 + \frac{1}{2})\) + \((x_2 + y_2 + \frac{1}{2})\) \(= (x_1 + y_1 + \frac{1}{2})\) + \((x_2 + y_2 + \frac{1}{2})\) \(= (x_1 + y_1 + \frac{1}{2})\) + \((x_2 + y_2 + \frac{1}{2})\) \(= (x_1 + y_1 + \frac{1}{2})\) + \((x_2 + y_2 + \frac{1}{2})\) \(= (x_1 + y_1 + \frac{1}{2})\) + \((x_2 + y_2 + \frac{1}{2})\) \(= (x_1 + y_1 + \frac{1}{2})\) + \((x_2 + y_2 + \frac{1}{2})\) \(= (x_1 + y_1 + \frac{1}{2})\) + \((x_2 + y_2 + \frac{1}{2})\) \(= (x_1 + y_1 + \frac{1}{2})\) \(= (x_1 + y_1 + \frac{1}{2})\) \(= (x_1 + y_1 + \frac{1}{2})\) \(= (x_1 + y_2 + \frac{1}{2})\) \	المراجعة المراجعة	
Therefore, W is a subspace of R3. EXAMPLE: Show that W=(x,y,z)ER3/x+y+z=1} is not a subspace of R3. Solution: Let, x=(x,y,z); y=(xz,yz,zz) in W => x1+41+z=1 and xz+yz+zz=1 ->0 To show that x+y E W i.e. x+y=1 x+y=(x1,y1,z1)+(xz,yz,zz) =(x1+xz,y1+yz,z1+zz) =(x1+xz,y1+yz+z1+zz) =(x1+xz+y1+z+z1+zz) =(x1+y1+z)+(xz+yz+zz) =1+1 =2 x+y E W Since, the first property does not hold. Therefore, W is not a subspace of R3. EXAMPLE: The set W of all summetric matrices (A=A) in Maxy(F) is a subspace of Mnxy(F).		$= \alpha(0) 0$ from 0
Therefore, W is a subspace of R3. EXAMPLE: Show that W=(x,y,\frac{1}{2}) \cdot \text{CR}^3/\text{x+y+z=1}\text{is not a subspace of R3. Solution: Let, \(\text{x} = (\text{x}, y_1, \frac{1}{2}) \cdot; y = (\text{x}, y_1, \frac{1}{2}) \cdot y = (\text{x}, y_1, \frac{1}{2}) \cdot		=0
Example: Show that $W = (x,y,z) \in \mathbb{R}^3/x + y + z = 1$ is not a subspace of \mathbb{R}^3 ! Solution: Let, $x = (x_1, y_1, z_1)$; $y = (x_2, y_2, z_2)$ in W $\Rightarrow x_1 + y_1 + z_1 = 1$ and $x_2 + y_2 + z_2 = 1 \rightarrow 0$ To show that $x + y \in W$ i.e. $x + y = 1$ $x + y = (x_1, y_1, z_1) + (x_2, y_2, z_2)$ $= (x_1 + x_2, y_1 + y_2, z_1 + z_2)$ $= (x_1 + x_2 + y_1 + y_2, z_1 + z_2)$ $= (x_1 + y_1 + z_1) + (x_2 + y_2 + z_2)$ $= 1 + 1$ $= 2$ $x + y \in W$ Since, the first property does not hold. Therefore, W is not a subspace of \mathbb{R}^3 . Example: The set W of all symmetric matrices W in W in W is a subspace of W in W in W in W is a subspace of W .		
Show that $N = (x,y,z) \in \mathbb{R}^3/x + y + z = 1$ is not a subspace of \mathbb{R}^3 . Solution: Let, $x = (x_1, y_1, z_1)$; $y = (x_2, y_2, z_2)$ in \mathbb{N} . $\Rightarrow x_1 + y_1 + z_1 = 1$ and $x_2 + y_2 + z_2 = 1 \rightarrow 0$ To show that $x + y \in \mathbb{N}$ i.e $x + y = 1$ $x + y = (x_1, y_1, z_1) + (x_2, y_2, z_2)$ $= (x_1 + x_2, y_1 + y_2, z_1 + z_2)$ $= (x_1 + x_2, y_1 + y_2, z_1 + z_2)$ $= (x_1 + y_1 + z_1) + (x_2 + y_2 + z_2)$ $= (x_1 + y_1 + z_1) + (x_2 + y_2 + z_2)$ $= 1 + 1$ $= 2$ $x + y \in \mathbb{N}$ Since, the first property does not hold. Therefore, \mathbb{N} is not a subspace of \mathbb{N}^3 . Example: The set \mathbb{N} of all symmetric matrices. $(A^{\dagger} = A)$ in $\mathbb{N}_{1} \times \mathbb{N}_{2} \in \mathbb{N}_{2}$ is a subspace of $\mathbb{N}_{1} \times \mathbb{N}_{2} \in \mathbb{N}_{2}$.		Therefore, W 18 a subspace of R.
is not a subspace of R^{3} . $Y = (x_2, y_2, z_2)$ in $Y = (x_1, y_1, z_1)$; $Y = (x_2, y_2, z_2)$ in $Y = (x_1, y_1, z_1)$; $Y = (x_2, y_2, z_2)$ in $Y = (x_1, y_1, z_1)$; $Y = (x_2, y_2, z_2)$ in $Y = (x_1, y_1, z_1)$; $Y = (x_2, y_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_1 + y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_2, z_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_2, z_2, z_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_2, z_2, z_2, z_2, z_2, z_2, z_2)$ in $Y = (x_1 + x_2, y_2, z_2, z_2, z_2, z_2, z_2, z_2, z_2, z$		
Solution: Let, $x = (x_1, y_1, z_1)$; $y = (x_2, y_2, z_2)$ in $y = (x_1, y_1, z_1)$; $y = (x_2, y_2, z_2)$ in $y = (x_1, y_1, z_1)$; $y = (x_2, y_2, z_2)$ To show that $x + y \in y = (x_1, y_2, z_2)$ $= (x_1 + x_2, y_1 + y_2 + z_1 + z_2)$ $= (x_1 + x_2 + y_1 + y_2 + z_1 + z_2)$ $= (x_1 + y_1 + z_1) + (x_2 + y_2 + z_2)$ $= (x_1 + y_1 + z_1) + (x_2 + y_2 + z_2)$ $= (x_1 + y_1 + z_1) + (x_2 + y_2 + z_2)$ $= (x_1 + y_1 + z_1) + (x_2 + y_2 + z_2)$ $= (x_1 + y_1 + z_1) + (x_2 + y_2 + z_2)$ $= (x_1 + y_2 + z_1 + z_2)$ $= (x_1 + y$		
Solution: Let, $x = (x_1, y_1, z_1)$; $y = (x_2, y_2, z_2)$ in $y = (x_1, y_1, z_2)$; $y = (x_2, y_2, z_2)$ in $y = (x_1, y_1, z_2)$. To show that $x + y \in \mathbb{N}$ i.e. $x + y = 1$. $x + y = (x_1, y_1, z_2) + (x_2, y_2, z_2)$. $= (x_1 + x_2, y_1 + y_2, z_1 + z_2)$. $= (x_1 + x_2 + y_1 + y_2 + z_1 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_1 + z_2) + (x_2 + y_2 + z_2)$. $= (x_1 + y_2 + z_$		is not a subspace of Roll
To show that $x+y \in N$ i.e. $x+y=1$ $x+y=(x_1,y_1,x_1)+(x_2,y_2,x_2)$ $=(x_1+x_2,y_1+y_2,x_1+x_2)$ $=(x_1+x_2+y_1+y_2+x_1+x_2)$ $=(x_1+y_1+x_2)+(x_2+y_2+x_2)$ $=(x_1+y_2+x_2)+(x_2+y_2+x_2)$ $=(x_1+x_2+y_1+x_2)+(x_2+y_2+x_2)$ $=(x_1+x_2+y_1+x_2+x_2)+(x_2+y_2+x_2)$ $=(x_1+x_2+y_1+x_2+x_2)+(x_2+y_2+x_2)$ $=(x_1+x_2+y_1+x_2+x_2+x_2)$ $=(x_1+x_2+y_1+x_2+x_2+x_2+x_2)$ $=(x_1+x_2+x_2+x_2+x_2+x_2+x_2+x_2)$ $=(x_1+x_2+x_2+x_2+x_2+x_2+x_2+x_2+x_2+x_2+x_2$		Solution:
To show that $x+y \in \mathbb{N}$ i.e. $x+y=1$ $x+y=(x_1,y_1,Z_1)+(x_2,y_2,Z_2)$ $=(x_1+x_2,y_1+y_2,Z_1+Z_2)$ $=(x_1+x_2+y_1+z_2+Z_1+Z_2)$ $=(x_1+y_1+z_2)+(x_2+y_2+z_2)$ $=1+1$ $=2$ $x+y \in \mathbb{N}$ Since, the first property does not hold. Therefore, \mathbb{N} is not a subspace of \mathbb{R}^3 . Example: The set \mathbb{N} of all summetric matrices $(A^{\dagger}=A)$ in $M_{nxn}(F)$ is a subspace of $M_{nxn}(F)$.		
x+y=(x1, y1, \(\)2, y2, \(\)2, \(\)2 = (\(\)1+\(\)2, \(\)1+\(\)2, \(\)2+\(\)2 = (\(\)1+\(\)2+\(\)2+\(\)2+\(\)2 = (\(\)1+\(\)1+\(\)2+\(\)2+\(\)2 = (\(\)1+\(\)1+\(\)2+\(\)2+\(\)2 = (\(\)1+\(\)1+\(\)2+\(\)2+\(\)2 = (\(\)1+\(\)1+\(\)2+\(\)2+\(\)2 = (\(\)1+\(\)1+\(\)2+\(\)2+\(\)2 = (\(\)2+\(\)2+\(\)2 = (\(\)1+\(\)1+\(\)2+\(\)2+\(\)2 = (\(\)1+\(\)1+\(\)2+\(\)3+\(\)2+		
= (x1+x2, y1+y2, Z1+Z2) = x1+x2+y1+y2+Z1+Z2 = (x1+y1+Z1)+(x2+y2+Z2) = 1+1 = 2 x+y & W Since the first property does not hold. Therefore, wis not a subspace of R3 Therefore, wis not a subspace of R3 The set w of all symmetric matrices (At=A) in Maxy(F) is a subspace of Maxy(F)		10 2000
= $21+22+11+12+21+22$ = $(21+21+21)+(22+12+22)$ = $1+1$ = 2 x+4 & M Since, the first property does not hold. Therefore, M is not a subspace of R^3 . [Example: The set M of all symmetric matrices ($R^4=R$) in Maxy ($R^4=R$) is a subspace of Maxy ($R^4=R$).		
= (x,+y,+z,)+(x2+y2+z2) = 1+1 = 2 x+y & W Since, the first property does not hold. Since, the first property does not hold. Therefore, W is not a subspace of R3. Therefore, W is not a subspace of Maxn(F) The set W of all summetime matrices (A+=A) in Maxn(F) is a subspace of Maxn(F)	,	/ / / ·
= 1+1 = 2 x+y & W Since. The first property does not hold. Since the first property does not hold. Therefore, W is not a subspace of R3. The set W of all symmetric matrices (A = A) in Maxy (F) is a subspace of Maxy (F).		- N 1 (0 , 1 at 17)
Since, the first property does not hold. Therefore, W is not a subspace of R3. Example: The set W of all symmetric matrices. (At = A) in Maxy (F) is a subspace of Maxy (F).		- 1 + 10
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(At = A) in Maxa (F) is a subspace of Maxa (F)		EVAMPLE:
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W={AEMnxn(F)/H=HJ.		(At = A) in Maxy (F) is a subspace of many
Exelusur		W= {A & Maxa(F)/A=HJ.
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