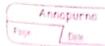
1. Recall the defination of the LI-norm. 11311, = 2, h /ail. Be showing that 9+ & satisfies each of the Conditions in the definition of a norm prove this is a vector name First do this for 122, and then do this for 18h It is now is one of the popular horm in IR.

It is now simply calculate by taking sobsom of the absolute value of the given point. L1 = ||x1|1 = |x| 91 1R. . To : Show LI Ys Vector norm Pt. Should Satisfy tellomist besta. GIEVEN a mapping 11.11 & 12-11 NI: positivery/non-negativity:-11 = ||x111 = |x/e/R V.x & 1R2 LI horm defined the absolute length of vector so It is aways positive. LI = 1/2/1 = /2/ = OEIR IFF x = 0 Yx =1R2 It Can gives Zero value & given point in vector ps zero. No: positive Scalableity:-L1 = 112111 = 110x11= [a] 11x11= = [a] 1x[e

we already know that 121/70 always and

		Annapurna Page: Date:
		alesante som as scalar 95 amays porthise
·liad		absorte value of any Scalar Ps aways porthire. So   all al > DEIKY a E 1R2
nois i	-	- 100 B-10 B-10
1 1 1 1 1 1	- N	4: Trangle Inequality 8.
		Let x= (x1, y1), y= (x2, y2) €1R2
	71 I	Now, which x ty experience the state of the
		1 1 2 1 - 11 x 1 - 11 x 11 - 11 x 11 - 11 x 11 - 11 x 11 - 11
		$L_{L}:   \alpha + y  _{1} =   \alpha + y     \Delta    +   y   =   \alpha  _{1}$
		: [[x+y]] × [[x] [] + [[y] [[] ]
1.1	34	Hence Li norm Satisfies all the properties Of vector norm so it is a vector norm in 122
		Of vector norm So It Is a vector Norm In 122
		Similary Let us assume the mapping
		11.11: 1Rh - MRangad-now Letter the continu
	Ð	Nx: positivete non-negativités=
02.	06	11 = 11 x81/12 = 2  x3/20 4 xie 1Rh
		Since, as Sum of absolute value of any
		humber is always positive.
Mex	7	े दा दास्था - स्था वर्षकार्थ र वर्ष
-1	1/4	No surify of one of soils and lit
		$\frac{1}{1} = \frac{N}{  x_i  _1} = \frac{N}{2}   x_i  _{20} $
		11 = $  xi  _1 = \frac{N}{2}  xi  _20$   $  xi $
	143	
	1	[1:= 1 x  1 = 1 ax   =  a 1 x
		= 1911x11 V x161k



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valve of any	Scalar is alway	o also, absorbe
Product of	two positive nor	the positive So
positive.	Poarrive No.	uber is always
	A P. C.	No.

N4: Trangle inequalitys.

Let, x= (x1, x2...-xn), y=(91,142...yn) EIRh

S= 1|x+y111 = |x+y112 | |x|1+11y111 = ||x|1+11y||1

Hence | LL horm Satisfies all the properties

Of Vector horm So It is a vector hormin

[2.] Recall the defination of Lo norm 11x1100 = max 1x910-134 Showing that 9+ Satisfies each 9 = \$11-19

of the Conditions in the defination of a norm prove this is a vector norm first do for 122 and then do this for 18h.

Solution Los norm is. One of the popular norm

of 1R. It fives the largest magnitude among
each element of a vector.

10 = ||x||a = max |xi| = max (|x||, |x2|-|xi| 1 = \$1,2-n\$ \ x \ | Rh.

To Show Los Is a vector norm under a mapping

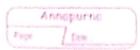
tiplic - Units filter

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	11.11:12-) IR it should satisfy each of the
	Following properties.
	The transfer of the same of th
	Mr. positivity/ non-negativity s-
	Mr. positivity/ non-negativity s- Let $\phi$ $V x = (x_1, y_1) \in \mathbb{R}^2$
	$Loo = \max_{1 \le i \le n}  x_i^i  = x > 0$
14913	96(112)(112)
4	Nula HIC HOSE
<del> </del>	Mr.
119:11 1-	
-	:11 e(1,2) 11 x 11 2 . 11 2 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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e parter	IN AMOSH DE 19 19 19 19 19 19 19 19 19 19 19 19 19
	[a = 1   x   a =   axi   axi
	16(112) 111211 191011 and 30 milionize axileira
11 11,04	
16327	121 121 12 (x11x2) - 201 (12 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
1 SYON	1 (3H ) \ (3\ \(\frac{1}{2}\) (3\ \(\frac{1}\) (3\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
- Head	
	N3 6: Trangle inequalité.
150	let x = (21/22), y = (0y1/42) e12
promoto	DOUT PARENT LICENSE DE SEL JOHN TO SEL JU
	also, (x+y) elle diameter Non
	3.
(1161 1	-10 = 1 1 x + y 11 a = max   x + y
W	9 (112)
	= x + y
r (grap)	1 1 x lot 1 x lot 1 y low 2

he Annapurna Hence, La norm Satisfy all the required porperties of vector norm 20, it is a vector norm 11 122 Similarie, Let us Suppose a mapping S. + Y x = (x1/x2/x3...xn) and y=(y1/42...yn) ent: 100 = Max |xi| = x >0 1 1 C 1 E S 112 - 43-10 S - 61 - 6 No Las max lails = 0 iff x =0 PEF112-12 Where or = (2010-0) GIR Ngs Let xeirh so axeirh Las 1/21/a = 1/aalla = max |9x1 = ax @1R i e & 112-113 N4 9 let x = (x11x2--xn), y=(y1142--yn) EIRh So Xty € IRN 100 100 100 1X+41 EIR = 11x110 +11y0011

	au the properties
	Hence, La Morm Satisfies So we can say
36)	Hence, La norm Satisfies all the properties of vector norm in 18th So we can say  let is vector norm.
	It is vector norm.
1	1 1-1 raigh be a Vector with
13	Let n=3 and Let xc 18h be a Vector with
100 .00	rising 1-1. By hand, Compute 1-norm, the
	on the same
	Let h=3 and Let XGIR De 1- norm, the xi=9-1. By hand, Compute 1- norm, the 2nd norm and the ∞- horm. Do the Same for the all-ones vector, i.e. xi ∈ IRh, where
	28=1 For PE \$11 h3
	2 2 L for 1 E 2 H
	Soln: Here n=3 and x = 1 Rh with
	Solh. Here n=3 and ret
	$2i = 1 - 1 = (\frac{1}{9}) = (\frac{1}{1} + \frac{1}{2} + \frac{1}{3}) \in \mathbb{R}^3$
	NOW - X 171 0 -8 121 NOW 1 11 11 11
4369	1017= 11xilla = 2   xilla = 11 + 2 + 3
	Now =    3
	L2 = 1/21/12 = 2 1/21/2
	12 = 1/21/12 - = 1/21
	1. 1000
	$\frac{1}{2} = \frac{1}{361}$
31 2	= 1.16
	f 1 - 51 1 2 - 5 1 1 - 5 1 1 - 5 1 1 1 - 5 1 1 1 1 1
	L = max  xi  = max  xi  = 1
	Y∈ \$1,2,32 Y∈ \$1,12,133
N	
-31-	ah
	6. La L 12 L 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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	inflacty is your minutes in with
	N=3 'and X = 1Rh with
	1 29-11-11-11-11-11-11-11-11-11-11-11-11-11

All will a without a will day!



11: 11/11/1 = |x 3 |xi| = 11/+ 11/+11/=3

L2: 1101112 = 3 11 702 11/2 = (1+1+1)/2

Las: 11 2111a = max (21) = 1

· Lo < L2 < L1

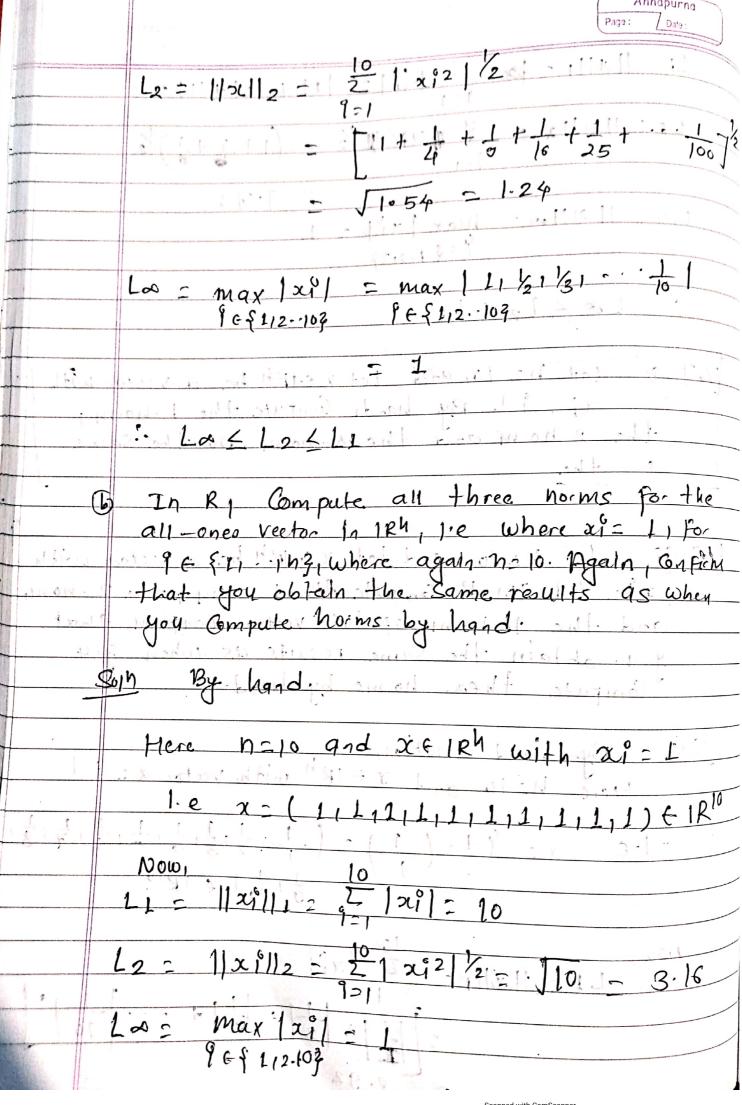
14] a Let h= 10, and Let x = 1Rh be a vector with xi= i-1. By hand, Compute the 1-horm, the 2-horm and the on-horm. Do the Same for the

[4] (a) Let n= 10,1 and Let x FIRM be a vector with xi= 9-1. In R, Compute the 1-noing the 2-horn, and the 1-horn of this vector. Confirm that you obtain the Same results as when goy Compute these horms by hand.

Soll By hand Solution, Here h=10 and x + 1Rh with vector x = i-1

1.e  $\chi = \frac{9-1-\left(\frac{1}{9}\right)-\left(\frac{1}{1},\frac{1}{2},\frac{1}{3},\frac{1}{4},\frac{1}{5},\frac{1}{6},\frac{1}{7},\frac{1}{8}\right)}{\frac{1}{9},\frac{1}{70}} \in \mathbb{R}^{10}$ 

Now,  $L_{1} = \frac{1}{|x|} + \frac$ 



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