All Subjects Notes, Past Quizzes & Past Papers
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State Continuous Mapping Theorem (2)

Define basis of finite dimensional vector space. (2)

Define Separable space and dense set (3)

Write cannonical form of R^n (3)

Show that the space l^∞ is complete (5)

Given a norm space $(X, \|.\|)$,

Prove that $|\|x\| - \|y\|| \leq \|x - y\|$

Q Draw the unit sphere for the norm define by $\|x\|_2 = \left(|\xi_1|^2 + |\xi_2|^2\right)^{1/2}$ in R^2

Q Show that the space of all the bounded functions on a set A is a metric space define as.

$$d(x,y) = \sup_{t \in A} |x(t) - y(t)|$$

Q Show that the identity operator $I: X \to X$ on a normed space $X \neq \{0\}$ is bounded and has norm $\|I\| = 1$

Q Find countable subset l^p for $1 \leq p < +\infty$

Q Define Riesz's Lemma.

Q Show rational numbers Q are dens in R.

Note: Submit this sheet to Superintendent, before leaving the Examination Center.

Mth 641

22/6/2019 Current paped :-

1) Define the neighbourhood of a point in a metric space. (2)

2) Define a compact metric space. X (2

3) Define convergent series in normed space (3)

4) Show that A subspace M is complete metric X is itself complete if the set M is closed in X. (3

5) Show that space l^∞ is convergent 5

6) State prove compactness theorem. 5

MTH 641. Paper

Show that absolutely convergent series is normed space,
define complete metric space and....
define linear operator
Prove closure of M is.....
X and Y are spaces then T:D(T)- - ->Y is linear operator if T^-1 exists if and only if Tx=0 implies that x=0
Prove Real line is a complete metric space

7:32 PM

Forwarded

MTH 641. Paper

1): Show that C is a Separable space,
2): compact space,
3): Give two examples of linear operator
4): Prove x belong to closure of M.
5): X and Y are spaces then T:D(T)- - ->Y is linear operator if T^-1 exists. Show that it is a linear operator. 6
6): Finite dimension prove

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VU

Rough Sheet

FALL/SPRING MID/FINAL TERM 20__ (Text)

Campus Code: VIED01

Course Code: MTH641

Date: __/__/__

Superintendent Signature:

Student Signature:

Student ID:

(1) In a metric space (X, d) every convergent sequence is Cauchy seq.

(2) The sequence $(\frac{1}{n})$ is strictly decreasing.

(3) A seq. (x_n) in a metric space is said to be strictly increasing if for all n, $x_n < x_{n+1}$

(4) Which of the following metric space is incomplete? R^n space l^p

(5) Two metric spaces (X, d) & $(\bar{X}, \bar{d})$ are said to be isometric if there exists an onto isometry of X onto $\bar{X}$.

(6) Which of the following axioms holds for any vector space in vector space X, which is field K? Ans: $(\forall x \in X) \; x + \omega = x = (\forall x \in X)$.

(7) Let X be an n-dimensional vector space over a field α of n elements equal to n.

(8) A sequence (x_n) in a normed space X is convergent if x_n converges to $x \in X$

(9) Let T be a linear operator, and if $\dim D(T) = \dim R(T)$ then $\dim N(T)$

(10) $d(x, y) \leq d(x, z) + d(z, y) \Rightarrow$ Triangular property.

(11) $C[a, b]$ forms the space of all continuous functions defined on $[a, b]$

(12) $x \notin B(x_0, r) \Rightarrow d(x, x_0) \geq r$

(13) A discrete metric space X is complete iff X is countable

(14) A metric space X is said to be complete if every sequence in X is a convergent subsequence

(15) Every finite dimensional normed space is Complete

(16) Which of the following is not a bounded operator? Integral operator.

Note: Submit this sheet to Superintendent before leaving the Examination Centre.

3. Show that $d(x,y) = \sqrt{|x-y|}$ defines a metric on the set of all real numbers.

Solution: Fix $x, y, z \in X = \mathbb{R}$, we need to verify the axioms of a metric. (M1) to (M3) follows easily from properties of absolute value. To verify (M4), for any $x, y, z \in \mathbb{R}$ we have

$$\begin{aligned}\Big[d(x,y)\Big]^2 = |x-y| &\leq |x-z| + |z-y| \\ &\leq |x-z| + |z-y| + 2\sqrt{|x-z|}\sqrt{|z-y|} \\ &= (\sqrt{|x-z|} + \sqrt{|z-y|})^2 \\ &= \Big[[d(x,z) + d(z,y)\Big]^2.\end{aligned}$$

Taking square root on both sides yields the triangle inequality.

5. Is boundedness of a sequence in a metric space sufficient for the sequence to be Cauchy? Convergent?

Solution: It turns out that boundedness of a sequence in a metric space does not imply Cauchy or convergent. Consider the sequence (x_n), where $x_n = (-1)^n$; it is clear that (x_n) is bounded in $(\mathbb{R}, d)$, where $d(x_m, x_n) = |x_m - x_n|$.

- (x_n) is not Cauchy in $\mathbb{R}$ since if we pick $\varepsilon = \frac{1}{2} > 0$, then for all N, there exists $m, n > N$ (we could choose $m = N+1$, $n = N+2$ for example) such that $d(x_m, x_n) = d(x_{N+1}, x_{N+2}) = 1 > \frac{1}{2}$.
- (x_n) is not convergent in $\mathbb{R}$ since it is not Cauchy.

VU

SPRING MID TERM 2019

Campus Code: PKR002

Course Code: MTH541

Rough Sheet

Date:

Superintendent Signature:

Student Signature:

Student ID:

① write the usual metric "d" in the Euclidean Plan R^2 and Euclidean space R^n

② write the norm on R^n for which it is a Banach space

③ If T is a linear operator then show that the null space $N(T)$ is a vector space (3)

④ Prove that $x \in T$ if there is a sequence $\{x_n\}$ in M such that $x_n \to x$ (5)

⑤ Let X be an n-dimensional vector space. Then show that any Proper Subspace Y of X has dimension less than n.

Note: Submit this sheet to Superintendent, before leaving the Examination Center

Q1. $B(x_0, 1) \subset X$. Justify its elements

Q2. Define Series in normed spaces

Q3. Differentiate between finite dimensional vector space and Infinite dimensional vector space.

Q4. Prove that every convergent Series in a metric space is a Cauchy sequence.

Q5. Prove $d(x,y) = \sqrt{x-y}$ triangle inequality

Q6. Prove that $\|\cdot\|$ is equivalent to $\|\cdot\|_0$.

"Current Paper"

(MTH-641) 21-June-2019

(1) Definition of Accumulation point. (2)

(2) Prove that Real line is metric space (2)

(3) Give 4-examples of linear operator. (3)

(4) Give 5-examples of norm space. (3)

(5) Prove that $(ST)^{-1} = T^{-1}S^{-1}$ (5)

(6) Theorem prove kiya tha continuous mapping ka. (5)

* MCQ's ~~same~~ (very easy)

Mostly from theorems and Lemma's statements.

Norm space ki 5 examples

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D (3,2) ki vector spaces find krni thi

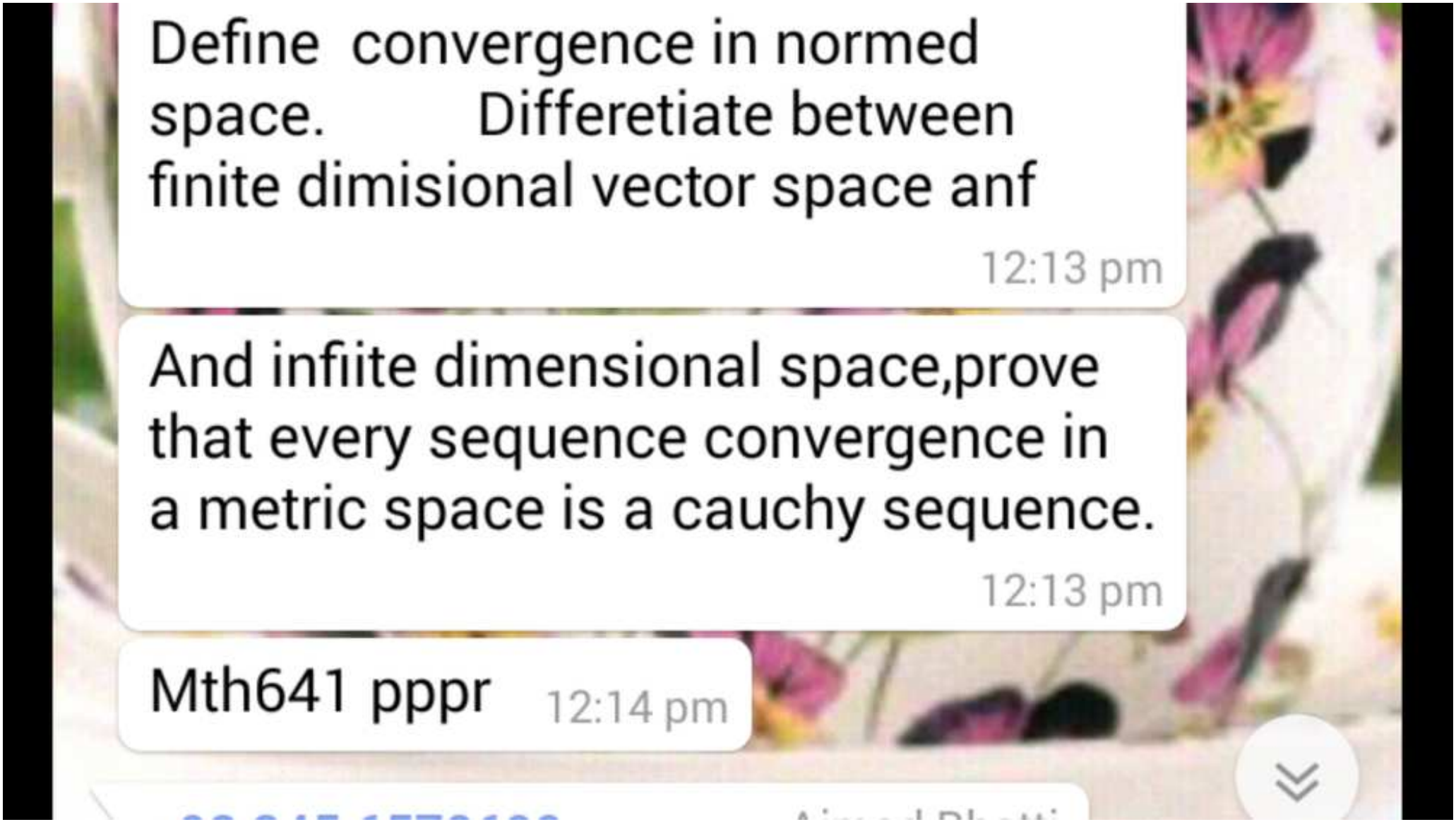
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ST =TS inverse prove krna tha

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Deff of continuous 1:07 PM

Continuous wala theorm 1:07 PM


Define convergence in normed space. Differetiate between finite dimisional vector space anf
12:13 pm
And infiite dimensional space,prove that every sequence convergence in a metric space is a cauchy sequence.
12:13 pm
Mth641 pppr 12:14 pm

Mth641 my paper

Define series of normed space
Give 5 examples of normed space
Is boundends of a sequence in a metric space sufficient for the sequence to be Cauchy? or convergent?
Show that d(x,y)=|x-y|underoot defines a metric on the set of all real numbers

mth641 today's paper
triangle inequality prove krni thi.(5)
bounded linear operator define.(3)
cauchy sequency ki convergent btani thi xn=1+1/n ki(2)
linear operator ki 4 examples (2)
compactness ka theorem tha.(5)mujy nai ata tha sai wala
isometric ki defination (3)