

Course outline

How does an NPTEL online course work?

Week 0

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Week 7

 19.1 Tangent space to a hypersurface

 20.1 The definition of a manifold

 21.1 Examples and non examples of manifolds

 21.2 The tangent space to a manifold

 Quiz: Week 7: Assignment 7

 Week 7 Feedback Form: Real Analysis II

 Lecture materials

Week 8

Week 9

Week 10

Week 11

Week 12

Download Videos

Week 7: Assignment 7

The due date for submitting this assignment has passed.

Due on 2021-09-15, 23:59 IST.

As per our records you have not submitted this assignment.

 1) Let $M \subset \mathbb{R}^n$ be a d -dimensional manifold. Let $a \in M$.

2 points

 We can always find a local parametrisation for M near a whose domain is \mathbb{R}^d .

 We cannot find a local parametrisation for M near a whose domain is \mathbb{R}^d if M is the open unit ball in \mathbb{R}^d .

 We cannot find a local parametrisation for M near a whose domain is \mathbb{R}^d if M is the unit sphere in \mathbb{R}^{d+1} .

 The only manifold for which find a local parametrisation for M near a whose domain is \mathbb{R}^d is $M = \mathbb{R}^d$.

No, the answer is incorrect.
Score: 0
Accepted Answers:
We can always find a local parametrisation for M near a whose domain is \mathbb{R}^d .

2) Which of the following sets are manifolds?

2 points

The graph of a continuous function.

The level set of a smooth function.

The set obtained by applying an orthogonal transformation (rotation) to a manifold.

 Any smooth curve in \mathbb{R}^n .

No, the answer is incorrect.
Score: 0
Accepted Answers:
The set obtained by applying an orthogonal transformation (rotation) to a manifold.

3) Which of the following sets are manifolds?

2 points

A cone with vertex at the origin.

 An ellipse in \mathbb{R}^2 .

 A union of two planes in \mathbb{R}^3 .

 A union of two disjoint hyperplanes in \mathbb{R}^n .

No, the answer is incorrect.
Score: 0
Accepted Answers:
An ellipse in \mathbb{R}^2 .
A union of two disjoint hyperplanes in \mathbb{R}^n .

4) Which of the following statements are true about the tangent space to a manifold?

2 points

It is a vector subspace.

The dimension of the tangent space is same as the dimension of the manifold.

 The tangent space is a vector subspace only at the point 0 (if $0 \in M$) and only at 0 it is true that the dimension of the tangent space is same as the dimension of the manifold.

The tangent space of a manifold at different points are all isomorphic.

No, the answer is incorrect.
Score: 0
Accepted Answers:
It is a vector subspace.
The dimension of the tangent space is same as the dimension of the manifold.
The tangent space of a manifold at different points are all isomorphic.