Introduction to Manifold Theory

Homework 7

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October 18, 2022

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1. Do Exercise 3.11: show that if a second-countable Hausdorff topological space X admits an n-dimensional smooth atlas, then X is an n-dimensional topological manifold (and thus a smooth manifold equipped with the equivalence class of this atlas).

2. Do Exercise 3.12: in imprecise terms, show that if a set X has a "sets-and-bijections smooth atlas" then X can be turned into a smooth manifold in a natural way.

3. Do Exercise 3.13: prove the analogue of Exercise 3.11 where the charts in your smooth atlas are allowed to have general smooth manifolds (rather than just open disks) as codomains.

4. Do Exercise 3.14: prove the analogue of Exercise 3.12 where the charts in your "sets-and-bijections smooth atlas" are allowed to have general smooth manifolds (rather than just open disks) as codomains.