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0.1 Manifolds, charts and atlases

A manifold is a set of points and associated charts.

A chart is a mapping from each point in a subset of the manifold to a point in a vector space.

These charts are invertible. If we are given coordinates, we can identify the point in the manifold it comes from.

0.1.1 Example: The sphere

We can map a hemisphere to a subset of R^2. Given a point in R^2 we can identify a specific point on the hemisphere, and given a s specific point on the hemisphere we can identify a point in R^2.

0.1.2 Universal charts

If the vector space is flat and non-repeating, then a single chart can be used to map the whole manifold.

0.1.3 Atlases

If we have a collection of charts which covers each point needs to be covered at least once, we have an atlas. Each chart needs to be to the same dimensional vector space.