Topology

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1 Manifolds

1.1 1 dimensional

- The Line (E^1)
- The Circle (S^1)
- The Interval (I)

1.2 2 dimensional

- Euclidean Plane (E^2)
- Sphere (S^2)
- Torus (T^2)
- Klein Bottle (K^2)
- Projective Plane (P^2)
- Disk (D^2)

1.3 3 dimensional

- Three dimensional Euclidean Space (E^3)
- Three Torus (T^3)
- Solid Ball (D^3)
- Projetive three-space (P^3)

2 Terms

Definition 2.1 (Topology vs. Geometry)**.**
The *topology* of a surface includes the properties of the surface that do not change when you stretch, twist, bend (without tearing) the surface. Such properties are:

- Number of holes the surface has
- ...

The *geometry* of a surface indludes all properties that do change when deforming the surface without tearing. Such properties are:

- ...

Definition 2.2 (Instrinsic vs. Extrinsic)**.**
The *intrinsic* properties of a surface are those a flatlander would notice while the *extrinsic* properties are those a flatlander would not notice, but a being one dimension higher looking at the surface would. These properties can be topological or geometrical. Note: a manifold does not need to exist in a higher dimensional space. It can exits in and of itself.

Definition 2.3 (Local vs. Global)**.**
Local proprties can be observed in an (arbitrarily) small region of the manifold while *global* proprties require consideration of the whole manifold.

Definition 2.4 (Homogenous vs. Nonhomogenous Geometries)**.**

Definition 2.5 (Closed vs. Open Manifold)**.**

Definition 2.6 (Orientable vs. Nonorientable)**.**