

Integration Workshop 2003
Outline of Topology Lectures
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Lecture 1: Basics

- Definition of topological spaces, continuous functions. First examples
- Closed sets. Closure, interior, boundary. Neighborhoods
- Metric spaces as topological spaces
- Subspace and quotient topologies
- The main separation and countability axioms
- Three exotic examples

Lecture 2: Compactness

- Motivation from calculus
- Definition of compactness
- Image of a compact set is compact
- Relations between compact, closed, and Hausdorff
- Baby Tychonoff theorem
- $[0, 1]$ is compact
- Compact subsets of \mathbf{R}^n (Heine-Borel theorem)

Lecture 3: Connectedness

- Motivation from calculus
- Definition of connectedness
- Variants
- Image of a connected set is connected
- Connected subsets of \mathbf{R}
- (Components, path components, quasi-components)
- (Remarks on the Topology-Geometry core course)