

Introduction to Algebraic Topology

I. Knot Theory

- A. Knots and links
- B. Knot coloring
- C. Alexander Polynomial
- D. Jones Polynomial
- E. Alternating links
- F. Lecture Supplement: Other Polynomials

II. Introduction to Topology

- A. Topological Spaces
- B. Limit Points and Sequences
- C. Continuous Functions
- D. Connectedness
- E. Compactness
- F. Quotient Spaces

III. Manifolds

- A. Definitions and First Examples
- B. 1-manifolds
- C. 2-manifolds

IV. Groups

- A. Basic Group Theory
- B. Group Presentations
- C. Braid Groups and the Jones Polynomial

V. The Fundamental Group

- A. Definition of the Fundamental Group
- B. Fundamental Group of S^1

C. Applications

VI. Seifert-Van Kampen Theorem

A. Free Products with Amalgamation

B. Seifert-Van Kampen Theorem

C. Fundamental Group, Surfaces, and 1st homology

D. Groups and Topology

VII. Knot Groups and Colorings

A. Knot Groups

B. Coloring Knots

VIII. Covering Spaces

A. Covering Spaces

B. Subgroups