# Singular Homology Theory and Applications

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**Resumo**

We propose the study of one of the most important topological invariants, the singular homology group, which has a fundamental role in the application of algebra in topology. The singular homology is a theory of homology that associates to each topological space a sequence of abelian groups and to each continuous application, between two given topological spaces, a sequence of induced homomorphisms. The objective is to present the construction of this topological invariant as well as its main properties, such as homotopy invariance and the Mayer-Vietoris sequence. We will end by showing the power of this tool through some applications, such as the Hairy Ball Theorem, Jordan Brouwer Separation Theorem, Borsuk-Ulam Theorem and the definition of Euler's Characteristic on manifolds.

## Referências

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