

Efficient Computation of Homology Groups of Simplicial Complexes Embedded in Euclidean Space

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Introduction

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- Simplicies

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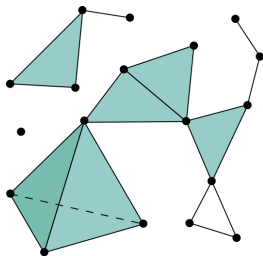
- Simplicies
- Simplicial Complexes
- Singular Homology

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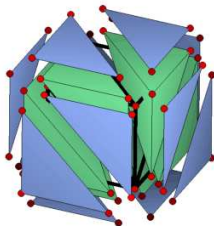
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http://commons.wikimedia.org/wiki/File:Simplicial_complex_example.svg

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http://www.math.tu-berlin.de/polymake/apps/topaz/images/pile_with_boundary.gif

Homology

Computed from a chain complex of abelian groups

$$\cdots \xrightarrow{\partial_{n+1}} C_n \xrightarrow{\partial_n} C_{n-1} \xrightarrow{\partial_{n-1}} \cdots \xrightarrow{\partial_4} C_3 \xrightarrow{\partial_3} C_2 \xrightarrow{\partial_2} C_1 \xrightarrow{\partial_1} C_0$$

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- Incremental methods

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- Geometric methods

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- Poincaré duality?