PhD Studies

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Topics of Algebraic Topology

Chapter 1

Simplical sets and complexes

1.1 Simplical sets

Let $\mathbf{\Delta}$ be the category of finite ordinal numbers, with order-preserving maps between them. More precisely, the objects for Δ consist of elements $\mathbf{n}, n \geq 0$, where $\mathbf{n}$ is a string of relations

$$0 \to 1 \to 2 \to \cdots \to n$$

(in other words $\mathbf{n}$ is a totally ordered set with $n+1$ elements). A morphism $\theta : \mathbf{m} \to \mathbf{n}$ is an order-preserving set function, or alternatively a functor. We usually commit the abuse of saying that $\mathbf{\Delta}$ is the ordinal number category.

A simplicial set is a contravariant functor $X : \Delta^{op} \to$ Sets, where Sets is the category of sets.

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1.2 Simplical complexes

Chapter 2

2.1 Section 2.1

2.2 Section 2.2