

Math 215A — 3-14-2017 — William Guss
Lecture Notes

1. HOMOLOGY THEORY

Consider the functor $h_* : \{\text{Pairs of top space}(X, A)\} \rightarrow Ab$ which maps morphisms

$$h_*(f : (X, A) \rightarrow (Y, B)) = h_*(X, A) \rightarrow h_*(Y, B).$$

Axioms of Homology

- Dimension; $X = \{pt\}$, $h_n(X) = 0, \forall n$.
- Exactness; $A \rightarrow i, (X,) \rightarrow (X, A); \cdots \rightarrow h_n(A) \rightarrow i_* \cdots$.
- Excision; $X = A \cup B$ with $(A, B, X \text{ top})$ then $A, A \cap B \rightarrow (X, B)$ induces an isomorphism $h_*(A, A \cap B) \rightarrow h_*(X, B)$.