

Topology = morse theory

↳ describe abstractions & features from raw data

Robust topological computations

Morse-Smale complex: partitions the space in regions of uniform gradient
 morse-smale complex = descending manifold \cap ascending manifold

generalization of monotonicity of functions

define function on a domain & define meshes on a domain

→ automatic meshing using Morse-Smale complex

application: abstract geometric shapes as graphs

→ many times it comes down to defining a function

merging critical points to create low-res topology

errors can be defined per-application

application: finding defects in meshes

examples: finding loops

applications: exploring high-dimensional data (intrinsic dimensions vs embedding dimensions)