Homotopy Groups of Spheres

Graduate Student Seminar

D. Zack Garza

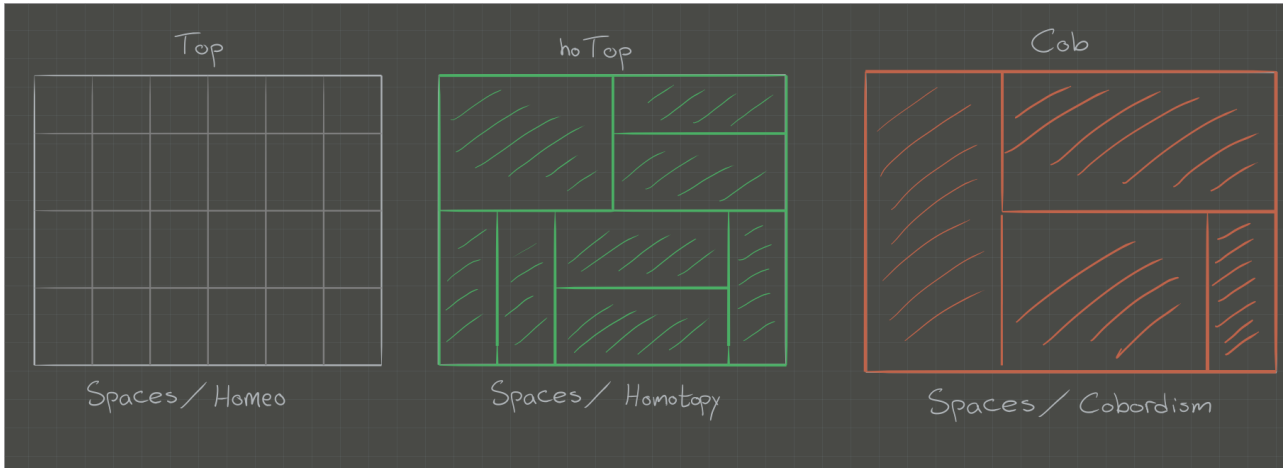
April 2020

Summary

- Homotopy as a means of classification somewhere between homeomorphism and cobordism
- Comparison to homology
- Higher homotopy groups of spheres exist
- Homotopy groups of spheres govern gluing of CW complexes
- CW complexes fully capture that homotopy category of spaces
- There are concrete topological constructions of many important algebraic operations at the level of spaces (quotients, tensor products)
- Relation to framed cobordism?
- "Measuring stick" for current tools, similar to special values of L-functions
- Serre's computation

Classification

- Holy grail: understand the topological category completely
  - I.e. have a well-understood geometric model one space of each homeomorphism type



Point 1

Point 2

Examples

Sphere 1