Homotopical algebra
Spring 2018

Detailed syllabus

0. Homotopy theory of topological spaces

1. Category theory
   (a) Categories, functors, and natural transformations
   (b) Limits and colimits
   (c) Adjunctions
   (d) Simplicial sets and geometric realization

2. Model categories and their homotopy categories
   (a) Definitions, examples, and elementary properties
   (b) The homotopy relation in a model category
   (c) The homotopy category of a model category
   (d) Derived functors, Quillen pairs, and Quillen equivalences

3. Transfer theorems
   (a) Cofibrantly generated model categories
   (b) Right-induced model structures
   (c) Left-induced model structures
   (d) Applications to monoidal model categories

4. Localizing model categories
   (a) Left Bousfield localizations
   (b) Right Bousfield localizations

Evaluation

Each week you will receive a set of exercises, of which you will have to hand in one to be graded. The average exercise grade will count for 30% of the final course grade.

The final exam will be a three-hour written test.
Bibliography


