

## Algebraic topology 1.

**Discussion #1.** (Read Chapter 0 and the first half of the Appendix).

Chapter 0 exercises 6a, 9, 17, 19, 23.

**Homework 1.** Due Monday, September 18, before the lecture.

Chapter 0 exercises 5, 10, 16, 20, 25.

1. Which of the following topological spaces are contractible?
  - 10-element set with the discrete topology.
  - 20-element set with the indiscrete topology.
  - 2-element set  $\{x, y\}$  with the topology of open sets  $\emptyset, \{x\}, \{x, y\}$ .
  - Semi-open unit square  $\{(x, y) \in \mathbb{R}^2 \mid 0 \leq x < 1, 0 \leq y < 1\}$ .
2. Show that a cell complex  $X$  is path-connected if and only if its 1-skeleton  $X^1$  is path-connected.