Introduction to Computational
Topology
Summer semester 2018

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UNIVERSITÄT BONN

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Exercise Sheet 4

Exercise 4.1: Homeomorphism vs. Homotopy Equivalence (4 Punkte)

Which relation is stronger? Homeomorphism or Homotopy equivalence?

Exercise 4.2: Homotopy Equivalence in Trees (4 Punkte)

Consider two finite trees T_1 and T_2 without root or order. When are T_1 and T_2 homotopy equivalent.

Exercise 4.3: Homotopy Equivalence Example (4 Punkte)

Consider the three spaces indicated below.

Show that they are homotopy equivalent although there does not exists a retraction for each pair of spaces, that transforms one into the other.

Exercise 4.4: Homotopy Equivalence and contractible spaces (4 Punkte)

Prove the following observation/example from the lecture:

Let X be a topological space, and Y a contractible space. Then X is homotopy equivalent to $X \times Y$.