

Math 829: Algebraic Topology

Homework 1

Due Wednesday, February 21st

- Find examples of topological spaces which are:
 - T_0 but not T_1 , and
 - T_1 but not T_2 .
- Let $X = \{a, b\}$ equipped with $\tau = \{\emptyset, \{a\}, X\}$, the Sierpinski topology, and Y any topological space. Enumerate all continuous functions $X \rightarrow Y$ and $Y \rightarrow X$.
- Let X, Y, Z, W be topological spaces.
 - Let $\alpha : Y \rightarrow W$ be a continuous function. Show that α induces a function $\alpha_* : [X, Y] \rightarrow [X, W]$.
 - Let $\beta : Z \rightarrow X$ be a continuous function. Show that β induces a function $\beta^* : [X, Y] \rightarrow [Z, Y]$.
 - Show that α_* and β^* depend only on the homotopy class of α and β respectively.
- Hatcher, Ch 0, Exercise 11.
- Hatcher, Ch 0, Exercise 13.
- Hatcher, Ch 0, Exercise 17.