M6140 Topology Exercises - 9th Week (2022)

1 The One-Point Compactification

Exercise 1. What is the one-point compactification of a compact Hausdorff space?

Exercise 2. What is the one-point compactification of $\mathbb{R}^n$?

Exercise 3. What is the one-point compactification of $(-2, -1) \cup (1, 2)$?

Exercise 4. What is the one-point compactification of $\{(x, y) \in \mathbb{R}^2 \mid 1 < x^2 + y^2 < 2\}$?

Exercise 5. What is the one-point compactification of $\{(x, y) \in \mathbb{R}^2 \mid x, y \in [-1, 1], |xy| < 1\}$?

Exercise 6. What is the one-point compactification of $\{(x, y) \in \mathbb{R}^2 \mid x \in [-1, 1]\}$?

Exercise 7. What is the one-point compactification of $\mathbb{R}^2 \setminus \{(0, 0)\}$?

Exercise 8. What is the one-point compactification of $\mathbb{N}$?

Exercise 9. What is the one-point compactification of $\coprod_{\mathbb{N}}(0, 1)$?