

INTRODUCTION TO ALGEBRAIC TOPOLOGY TUTORIAL 2

JIE WU

Problem 1. Show that any map from a compact space to a Hausdorff space is a closed map.

Problem 2. Show that D^n/S^{n-1} is homeomorphic to S^n .

Problem 3. Show that $X \wedge (Y \wedge Z)$ is homeomorphic to $(X \wedge Y) \wedge Z$ if X and Z are locally compact and Hausdorff.

Problem 4. Let X be a locally compact Hausdorff space. Given a point $x \in X$ and a neighborhood U of x . Show that there is an open set V such that $x \in V \subseteq \bar{V} \subseteq U$ and \bar{V} is compact. (The hint is given in the lecture notes.)

Problem 5. Show that (1). $\mathbb{R}P^n$ is Hausdorff and (2). $S^n/(\mathbb{Z}/2) \cong \mathbb{R}P^n$.

Problem 6. For each $m, n \geq 0$, show that S^{m+n} is homeomorphic to $S^m \wedge S^n$.

Reference: C. R. F. Maunder, Algebraic Topology, Cambridge University Press, 1980, Page 208, Example 6.2.15.