

EXERCISE SESSION XI

Exercise I

Let $f : X \rightarrow Y$ be an onto continuous closed map. Prove that if X is a normal space and Y is Hausdorff, then Y is normal.

Exercise II

Let $f, g : X \rightarrow Y$ be two continuous maps from a topological space X to a Hausdorff space Y . Prove that $\{x \in X \mid f(x) = g(x)\}$ is a closed subspace of X .

Exercise III

Let $X = Y = \mathbb{N}$ with cofinite topology, let f be the identity map and g be the map defined on X by $g(x) := x \vee 5$. Prove that Y is not Hausdorff, that f and g are continuous but that $\{x \in X \mid f(x) = g(x)\}$ is not closed in X .