

Topology II

Exam 2

Exam December 12, 2024

Exam time 14.00-17.00

Problems

p1. Let X and Y be topological space for which the product space $X \times Y$ is separable. Show that Y is separable.

p2. Let X and Y be topological spaces, $a \in X$, $b \in Y$. Show that

$$Q((a, b), X \times Y) \subset Q(a, X) \times Q(b, Y),$$

where $Q(z, Z)$ is the quasicomponent of $z \in Z$ of a topological space Z .

p3. Show that the product space $\mathbb{R}^{\mathbb{N}}$ is not locally compact. Here \mathbb{R} has the usual Euclidean topology.

p4. Suppose a topological space X is a union $X = E \cup F$ of closed subspaces E and F , which are T_3 spaces. Is X is a T_3 space? Proof or counterexample.