

Problems in Topology (Math436)

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Read end of Chapter 5, Beginning of Chapter 6.

- (1) Let X_i , $i \in I$ (I some index set) be a topological space and assume that $A_i \subset X_i$ is closed for $i \in I$.
Show that $\prod_{i \in I} A_i$ is closed in $\prod_{i \in I} X_i$ with respect to the product topology.
- (2) Find a closed set F in \mathbb{R}^2 for which $\pi_1(F)$ is open.
- (3) Problem 1 page 84.
- (4) Problem 8 page 84
- (5) (*) Let X_n be a separable topological space for $n \in \mathbb{N}$.
Show that $\prod_{i=n}^{\infty} X_n$ is also separable with respect to the product topology.