

Title

Author

Date

**P 1    problem 3.10**

Suppose that  $(X_\alpha)_{\alpha \in A}$  is an indexed family of topological spaces, and  $Y$  is a topological space. A map  $f : \coprod_{\alpha \in A} X_\alpha \rightarrow Y$  is continuous if and only if its restriction to each  $X_\alpha$  is continuous. The disjoint union topology is the unique topology on  $\coprod_{\alpha \in A} X_\alpha$  with this property.

**(sol) 1.1    problem 3.10**

The gluing lemma shows that if each restriction is continuous, then  $f$  is continuous. Assume that  $f$  is continuous. Then the restriction to each  $X_\alpha$  must also be continuous because each open set in  $X_\alpha$  is also open in the disjoint union space since  $X_\alpha$  is by definition open so any open set intersected with it is also open.

The disjoint union topology is the unique topology with this property because...

**P 2**

**(sol) 2.1**