



**Definition**

**Proposition 1.** *Suppose  $\mathcal{T}_1$  and  $\mathcal{T}_2$  are two topologies on a set  $X$ . Then  $\mathcal{T}_1 \cap \mathcal{T}_2$  is a topology on  $X$ .*

More generally, the intersection of a family of topologies is a topology.

Now suppose we are given some set of subsets  $\mathcal{B}$  of  $X$ . The intersection of the set of topologies on  $X$  which contain  $\mathcal{B}$  is a topology on  $X$ . We call this the *topology generated by  $\mathcal{B}$* .



