

**Question**

Let  $\mathcal{A}$  be a collection of sets. Can we find a smallest (in some sense)  $\sigma$ -algebra containing  $\mathcal{A}$ ?

**Answer**

Let  $\mathcal{M}_0 = \bigcap_{\mathcal{M} \supseteq \mathcal{A}} \mathcal{M}$  of the collection of all  $\sigma$ -algebras containing  $\mathcal{A}$  is a  $\sigma$ -algebra containing  $\mathcal{A}$  and is the smallest.