

Show that a subspace of a Hausdorff space is Hausdorff.

Let  $(X, \tau_x)$  be Hausdorff. Let  $Y$  be a subspace with the subspace topology  $\tau_y$ . Let  $a, b$  be distinct points in  $Y$ .

then we have  $u, v \in \tau_x$  s.t.

$$a \in u, b \in v, u \cap v = \emptyset$$

$$a \in u_y = u \cap Y, b \in v_y = v \cap Y$$

$$\text{and clearly } (u_y \cap v_y) \subset (u \cap v) = \emptyset \quad \square$$