

15. Show the T_1 axiom is equivalent to the condition that for each pair of points of X , each has a neighborhood not containing the other.

The condition that finite point sets be closed is in fact weaker than the Hausdorff condition. For example, the real line \mathbb{R} in the finite complement topology is not a Hausdorff space, but it is a space in which finite point sets are closed. The condition that finite point sets be closed has been given a name of its own: it is called the **T_1 axiom**. (We shall explain the reason for this strange terminology in Chapter 4.) The T_1 axiom will appear in this book in a few exercises, and in just one theorem, which is the following:

(from Closed Sets and Limit Points)