

Homework Assignment 2, MATH 515, Spring 09

Problem 6) (8 pts) Let E_i be normed vector spaces with norms $|\cdot|_i$ for $i = 1, 2$. Show that $E_1 \times E_2$ with the norm $|(x, y)| := \max(|x|_1, |y|_2)$ is a normed vector space. Show that this norm induces the product topology determined by $|\cdot|_i$ on E_i .

Problem 7) (16 pts) page 46, Chapter 2, §5, Exercise 9. **Note:** The definition of **exhaustive** sequence in Lang is erroneous. It has to be assumed that the sequence of compact sets $\{K_i\}$ is **increasing**, i. e. $K_i \subset K_{i+1}$ for all positive integers i . Moreover, note that only (f) requires the assumption that E is complete.