

MATH 4200/6200: PROBLEM SET 7
DUE IN CLASS FRIDAY, OCTOBER 17, 2008

A. Munkres Section 19: 1, 3, 7, 8; Section 22: 4.

B. Let (X_n, d_n) be metric spaces, where n varies through \mathbb{Z}_+ . Let $X = \prod_{n=1}^{\infty} X_n$. In an earlier problem set, you showed that, where

$$D(\{y_n\}_{n=1}^{\infty}, \{z_n\}_{n=1}^{\infty}) = \sum_{n=1}^{\infty} 2^{-n} \frac{d_n(y_n, z_n)}{1 + d_n(y_n, z_n)},$$

D is a metric on X . One can thus obtain topologies on X in either of the following two ways: either consider the metric topologies induced on X_n by d_n and then endow X with the product topology; or endow X with the topology induced by the metric D . Prove that these two topologies on X are the same.