

[Tanaka, Yoshio](#)

**Necessary and sufficient conditions for products of  $k$ -spaces.** (English) Zbl 0727.54012  
[Topology Proc. 14, No. 2, 281-313 \(1989\).](#)

The product of two  $k$ -spaces need not be a  $k$ -space, even if one of the factors is as nice as a separable metric space. The finding of necessary and sufficient conditions for the product of two  $k$ -spaces to be a  $k$ -space is a complicated process. This paper gives a number of such conditions, some of which involve, or are equivalent to, a set-theoretic assumption. Here is an example of a theorem from the paper giving one of the latter kind of condition. If  $X$  and  $Y$  are dominated by spaces which are closed images of metric spaces, then the statement that the cardinal number  $b$  is not greater than or equal to  $\omega_2$  is equivalent to the statement that  $X \times Y$  is a  $k$ -space if and only if one of the following holds:  $X$  or  $Y$  is locally compact;  $X$  and  $Y$  are metrizable;  $X$  and  $Y$  are locally  $k_\omega$ . The author raises several questions, one of which is whether the equivalence in the above statement is true whenever  $X$  and  $Y$  are dominated by compact spaces. In the last section, conditions are given for  $X^\omega$  to be a  $k$ -space.

Reviewer: [R.A.McCoy \(Blacksburg\)](#)

**MSC:**

[54D50](#)  $k$ -spaces  
[54B10](#) Product spaces in general topology

Cited in 4 Documents

**Keywords:**

[product of two  \$k\$ -spaces](#)