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SOME CHARACTERIZATIONS OF PRE-METRIZABILITY

A. GARCÍA-MÁYNEZ† AND M. A. LÓPEZ-RAMÍREZ

Abstract. The class of pre-metrizable spaces (i.e., perfect preimages of metrizable spaces) coincides with the class of paracompact p-spaces. In this paper we give three additional characterizations. One of them is the following:

(1) A Tychonoff space X is pre-metrizable if and only if there exists a zero set H in $X \times \beta X$ such that $\Delta(X) \subseteq H \subseteq X \times X$, where βX is the Stone-Čech compactification of X and $\Delta(X) = \{(x, x) : x \in X\}$.

Another one depends on the existence of a countable family of normal covers of X satisfying a certain property.

The final characterization requires X to be in the class of pseudo-paracompact spaces, which includes both pseudocompact and paracompact spaces, together with an additional property which requires every open cover of X to be semi-normal.

1. Definitions and preliminary results

All spaces considered in this paper are completely regular and Hausdorff. As usual, βX denotes the Stone-Čech compactification of a space X. The p-spaces were originally defined by A. V. Arhangel'skii in [1]. Čech-complete and Moore spaces, and hence, locally compact and metrizable spaces, are examples of p-spaces. An interesting subclass of Čech-complete spaces are *ultracomplete* spaces:

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Key words and phrases. p-space, p-paracompact, pre-metrizable, perfect map, normal cover, p-frame.

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† This article is dedicated to the memory of Professor Adalberto García-Maynez y Cervantes (1945–2016), example and guide of many, but above all, friend in difficult times, when few are.

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