Al-Omari, Ahmad; **Noiri, Takashi**
Characterizations of z-Lindelöf spaces. (English) ⟨Zbl 1424.54051⟩

This article is concerned with certain characterizations and a study of z-Lindelöf spaces, introduced in 2009 by A. T. Al-Ani, through some new types of sets formulated by the authors; the notion of ω-cozero set is the basic one for the purpose. The authors define a subset A of a topological space (X, τ) to be ω-cozero if to each $a \in A$ there corresponds a cozero set U_a containing a such that $U_a - A$ is countable (the complement of an ω-cozero set is called an ω-zero set). A space (X, τ) is called z-Lindelöf if every cover of X by cozero sets has a countable subcover. Clearly the notion of ω-cozero set is a modulated version of cozero set. The relations of ω-cozero sets with cozero sets, open sets and ω-open sets are presented through diagrams and examples. Further it is demonstrated that for a topological space (X, τ), the ω-cozero sets form a topology on X, just like the cozero sets. Next some characterizations of ω-cozero sets are delivered. Then come the main results – formulations of z-Lindelöf space through ω-cozero sets and ω-zero sets. After that certain basic results concerning z-Lindelöfness, analogous to those for Lindelöf spaces, are derived. For this purpose a good many new notions are introduced in the paper. These are completely ω-regular space, almost ω-regular space, cozero-irresolute function, almost cozero function, ω-zero function, ω-cozero-continuous function and ω^*-cozero-continuous function. These concepts are utilized to study z-Lindelöf spaces, and their preservation properties for direct and inverse images under the stated types of maps.

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MSC:

54D20	Noncompact covering properties (paracompact, Lindelöf, etc.)
54C05	Continuous maps
54C08	Weak and generalized continuity
54C10	Special maps on topological spaces (open, closed, perfect, etc.)

Keywords:

cozero set; ω-open set; Lindelöf; z-Lindelöf

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