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Convergence in compacta and linear Lindelöfness

Comment.Math.Univ.Carolinae 39,1 (1998) 159-166.

Abstract: Let X be a compact Hausdorff space with a point x such that $X \setminus \{x\}$ is linearly Lindelöf. Is then X first countable at x? What if this is true for every x in X? We consider these and some related questions, and obtain partial answers; in particular, we prove that the answer to the second question is "yes" when X is, in addition, ω-monolithic. We also prove that if X is compact, Hausdorff, and $X \setminus \{x\}$ is strongly discretely Lindelöf, for every x in X, then X is first countable. An example of linearly Lindelöf hereditarily realcompact non-Lindelöf space is constructed. Some intriguing open problems are formulated.

Keywords: point of complete accumulation, linearly Lindelöf space, local compactness, first countability, κ-accessible diagonal
AMS Subject Classification: 54F99, 54D30, 54E35