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G_δ -modification of compacta and cardinal invariants

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Abstract: Given a space X , its G_δ -subsets form a basis of a new space X_ω , called the G_δ -modification of X . We study how the assumption that the G_δ -modification X_ω is homogeneous influences properties of X . If X is first countable, then X_ω is discrete and, hence, homogeneous. Thus, X_ω is much more often homogeneous than X itself. We prove that if X is a compact Hausdorff space of countable tightness such that the G_δ -modification of X is homogeneous, then the weight $w(X)$ of X does not exceed 2^ω (Theorem 1). We also establish that if a compact Hausdorff space of countable tightness is covered by a family of G_δ -subspaces of the weight $\leq c = 2^\omega$, then the weight of X is not greater than 2^ω (Theorem 4). Several other related results are obtained, a few new open questions are formulated. Fedorchuk's hereditarily separable compactum of the cardinality greater than $c = 2^\omega$ is shown to be G_δ -homogeneous under CH. Of course, it is not homogeneous when given its own topology.

Keywords: weight, tightness, G_δ -modification, character, Lindelöf degree, homogeneous space

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