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The structure of the σ -ideal of σ -porous sets

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Abstract: We show a general method of construction of non- σ -porous sets in complete metric spaces. This method enables us to answer several open questions. We prove that each non- σ -porous Suslin subset of a topologically complete metric space contains a non- σ -porous closed subset. We show also a sufficient condition, which gives that a certain system of compact sets contains a non- σ -porous element. Namely, if we denote the space of all compact subsets of a compact metric space E with the Vietoris topology by $\mathcal{K}(E)$, then it is shown that each analytic subset of $\mathcal{K}(E)$ containing all countable compact subsets of E contains necessarily an element, which is a non- σ -porous subset of E . We show several applications of this result to problems from real and harmonic analysis (e.g. the existence of a closed non- σ -porous set of uniqueness for trigonometric series). Finally we investigate also descriptive properties of the σ -ideal of compact σ -porous sets.

Keywords: σ -porosity, descriptive set theory, σ -ideal, trigonometric series, sets of uniqueness

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