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Topological characterization of the small cardinal i

Comment.Math.Univ.Carolinae 44,4 (2003) 745-750.

Abstract: We show that the small cardinal number $i = \min\{|\mathcal{A}| : \mathcal{A} \text{ is a maximal independent family}\}$ has the following topological characterization: $i = \min\{\kappa \leq c : \{0, 1\}^\kappa \text{ has a dense irresolvable countable subspace}\}$, where $\{0, 1\}^\kappa$ denotes the Cantor cube of weight κ . As a consequence of this result, we have that the Cantor cube of weight c has a dense countable submaximal subspace, if we assume (ZFC plus $i = c$), or if we work in the Bell-Kunen model, where $i = \aleph_1$ and $c = \aleph_{\omega_1}$.

Keywords: independent family, irresolvable, submaximal

AMS Subject Classification: Primary 54A05, 54A35, 54C25; Secondary 54A25, 54B05, 54B10