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Transversals of almost disjoint families

For a family of sets A, a set X and a cardinal k (usually $\leq \omega$), X is said to be a k-transversal of A if $X \subseteq \bigcup A$ and $0 \neq |a \cap X| < k$ for each $a \in A$. If $k = 2$ we will say that X is a transversal of A. X is said to be a Bernstein set for A if $\emptyset \neq a \cap X \neq a$ for each $a \in A$. When an almost disjoint family admits a k-transversal or a Bernstein set was first studied in [1] motivated mainly by applications in topology.

We consider here a weaker property:

Definition Given a family of sets A, A is said to admit a σ-transversal if A can be written as $A = \bigcup\{A_n : n \in \omega\}$ such that each A_n admits a transversal.

The restriction that an almost disjoint family admits a transversal is quite strong and not of much interest. However, quite a wide class of almost disjoint families admit σ-transversals. We consider the question when an almost disjoint family admits a σ-transversal and present some examples and applications.

References

[1] P. Erdős and A. Hajnal, *On a property of families of sets*. Acta Math. Acad. Sci. Hungar. **12**(1961), 87–124.