Real Analysis Exchange
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STRONG ALGEBRABILITY OF SEQUENCES AND FUNCTIONS

Assume that B is an algebraic structure or a topological algebraic structure of some fixed category $\mathcal{C}$ (such as a linear space, a linear algebra, a Banach space, etc.) We say that a set $E \subset B$ is $\mathcal{C}$–structuralbe (lineable, algebrable, spaceable, respectively) if there is a substructure A of B with $A \subset E \cup C$, where C is the set of the constants of a structure B. In particular, if B is a linear space being also an algebra (we call it a linear algebra), we say that $E \subset B$ is algebrable whenever $E \cup \{0\}$ contains a subalgebra A of B.

For a cardinal κ, we say that S is called a κ-generated free structure of a given category, if there exists a subset $X = \{x_\alpha : \alpha < \kappa\}$ of S such that any function f from X to some structure S' of the same category as S, can be uniquely extended to a homomorphism from S into S'.

Proposition 1. *The set c_{00} is ω–algebrable in c_0 but is not strongly 1–algebrable.*

Theorem 2. *The set $c_0 \setminus \bigcup\{l^p : p \geq 1\}$ is densely strongly $\mathfrak{c}$–algebrable in c_0.*

Theorem 3. *The set of all sequences in l^∞ which set of limits points is homeomorphic to the Cantor set is comeager and strongly $\mathfrak{c}$-algebrable.*

Theorem 4. *The set of all non-measurable functions from $\mathbb{R}^\mathbb{R}$ is strongly $2^\mathfrak{c}$–algebrable.*

Theorem 5. *The set of all sequences in l^∞ which do not attain their supremum is spaceable but it is not 1-algebrable.*