

Around powers of singular cardinals.

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One of the central topics of set theory since Cantor has been the study of the power function $\kappa \mapsto 2^\kappa$. The basic problem is to determine all the possible values of 2^κ for a cardinal κ .

Paul Cohen proved the independence of the Continuum Hypotheses ($2^{\aleph_0} = \aleph_1$) and invented a major tool for proving independence results - the method of forcing.

Easton building on Cohen's results showed that the function $\kappa \mapsto 2^\kappa$ for regular κ can behave in any prescribed way consistent with the Zermelo-König inequality, which entails $\text{cf}(2^\kappa) > \kappa$. This reduces the study to singular cardinals.

It turned out that the situation with singular cardinals is much more involved. There are presently three main tools for dealing with powers of singular cardinals:

PCF theory, Inner model theory and forcing techniques involving large cardinals.

In the talk we plan to address all of them and state old, as well as new results on the subject.