

Borsuk's conjecture

We will discuss about famous conjecture from the Karol Borsuk's article "Three theorems about n dimensional sphere"(1933)

Conjecture 1 *Every bounded subset E of the space \mathbb{R}^n be partitioned into $(n + 1)$ sets, each of which has a smaller diameter than E*

If we consider regular n -dimensional simplex, we can see that we need at least $n + 1$ parts, but is it enough? Borsuk himself proved that it's true if the dimension is 2. In 1947 Julian Perkal proved that it's true for $n = 3$, but in high dimensions the conjecture is wrong! The first counterexamples in dimensions $n > 2014$ and $n = 1325$ were given by Jeff Kahn and Gil Kalai in 1993. The most new record for counterexamples were given by Andriy Bondarenko in 2013. He provides counterexamples for $n \geq 65$. I want to talk about very beautiful counterexample which was given by Andriy Raigorodskii in 1997 for $n = 561$.