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3:45 PM
125 Hayes-Healy Hall

Title: Using restricted-growth sets that are only given a few colors to produce monochromatic sets.

Abstract:

The infinite version of Ramsey's theorem for n-tuples and k colors (written RT^n_k) says that if every n-element subset of an infinite set is given one of k many colors, then there is an infinite monochromatic subset (where every n-element set is given a the same color). Since a subset of a monochromatic set is monochromatic, Ramsey's theorem can produce sets whose elements (listed in order) grow arbitrarily quickly.

In the paper "Some Ramsey-type theorems," Paul Erd\"os and Fred Galvin prove that every coloring of n-tuples has an infinite subset whose rate of growth is restricted and where at most 2^{n-1} colors are used (I will call this result bgRT^n). They also prove that there are colorings that don't have monochromatic sets with restricted rates of growth.

In this talk, I will show that it is possible to prove the standard version of Ramsey's theorem using bgRT^n along with computable techniques. This part of a larger project in reverse mathematics, which involves studying the proof theoretic strength of Ramsey's theorem. This result shows that bgRT^n is at least as strong as RT^n.

No advanced logic or combinatorics is assumed.