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Yuval Peres* (peres@stat.berkeley.edu), Statistics Department, University of California, Berkeley, CA 94720. *Chromatic number of a graph on the integers via a Cantor set construction.*

Let $\{n_k\}$ be a lacunary sequence, i.e. the ratio of successive elements of the sequence is at least some $q > 1$. In 1987, Erdos asked for the chromatic number of a graph G on the integers, where two integers are connected by an edge iff their difference is in the sequence $\{n_k\}$. Y. Katznelson found a connection to a diophantine approximation problem, which he solved by a Cantor set construction. In joint work with W. Schlag, we improve Katznelson's bounds for these problems using the Lovasz local lemma.

The last problem I'll discuss is estimating the length of projections of nonrectifiable self-similar sets of Hausdorff dimension 1. A qualitative result follows from Besicovich (1938), but the best available quantitative upper and lower bounds (obtained jointly with B. Solomyak) differ sharply, and surprisingly involve the function $\log^*(n)$, the height of a tower of iterated exponentials that first exceeds n . (Received March 06, 2006)