1053-05-30   **David Galvin*** (`dgalvin1@nd.edu`), Department of Mathematics, 255 Hurley Hall, University of Notre Dame, South Bend, IN 46556, and **Yufei Zhao**, Department of Mathematics, Massachusetts Institute of Technology, Cambridge, MA 02139. *The number of independent sets in graphs with small maximum degree.*

At most how many independent sets can a graph have? In 2001 Kahn conjectured that for any graph G without isolated vertices, the number of independent sets satisfies

$$i(G) \leq \prod_{uv \in E(G)} \left(2^{d(u)} + 2^{d(v)} - 1 \right)^{1/d(u)d(v)},$$

where $d(\cdot)$ denotes degree. By reducing to a finite search, we prove this bound for all G with maximum degree at most 5.

Kahn's conjecture is a special case of a 1991 conjecture of Alon: for a d-regular graph G on n vertices, the number of independent sets satisfies

$$i(G) \leq (2^{d+1} - 1)^{n/2d}.$$

In 2001 Kahn proved this conjecture for bipartite graphs, and the full conjecture was recently resolved by Zhao.

In this talk, we will describe both proofs. (Received August 10, 2009)

1