Meeting: 1001, Evanston, Illinois, SS 2A, Special Session on Extremal Combinatorics

1001-05-177 **Myung S Chung**, **Tao Jiang** and **Douglas B West*** (west@math.uiuc.edu), Mathematics Department, University of Illinois, 1409 W. Green Street, Urbana, IL 61801-2975. *Large graphs with bounded degree and no long induced path.*

A graph is *H-free* if it has no induced subgraph isomorphic to H. Let $\mathrm{ex}^*(D;H)$ be the maximum number of edges in an H-free connected graph with maximum degree D; this is finite if and only if H is a disjoint union of paths. Earlier results include $\mathrm{ex}^*(D;P_4) = D^2$ and the exact computation of $\mathrm{ex}^*(D;2P_3)$. For $m \geq 6$, we prove that $\mathrm{ex}^*(D;P_m) \in \Theta(D^{\lceil m/2 \rceil})$, with leading coefficient between $\frac{1}{8}$ and $\frac{1}{2}$ when m is odd and between $\frac{1}{2}$ and 2 when m is even. For $m = 5$, we determine the exact value: $\mathrm{ex}^*(D;P_5) = \lfloor \frac{2}{27}D^3 + \frac{7}{18}D^2 + \frac{1}{6}D \rfloor$. (Received August 24, 2004)