

**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  $\text{ex}^*(D; H)$  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  $\text{ex}^*(D; P_4) = D^2$  and the exact computation of  $\text{ex}^*(D; 2P_3)$ . For  $m \geq 6$ , we prove that  $\text{ex}^*(D; P_m) \in \Theta(D^{\lceil m/2 \rceil})$ , 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:  $\text{ex}^*(D; P_5) = \lfloor \frac{2}{27}D^3 + \frac{7}{18}D^2 + \frac{1}{6}D \rfloor$ . (Received August 24, 2004)