

Meeting: 1004, Bowling Green, Kentucky, SS 2A, Special Session on Graph Theory

1004-05-66 **Peter Hamburger*** (hamburge@ipfw.edu), 2101 Coliseum Blvd. East, Fort Wayne, IN 46805,
and **Nana Arizumi** and **Alexandr Kostochka**. *On k -additive spanners or k -detour subgraphs.*

A spanning subgraph G of a graph H is a k -detour subgraph of H if for each pair of vertices $x, y \in V(H)$, the distance, $dist_G(x, y)$, between x and y in G exceeds that in H by at most k . Such subgraphs sometimes also are called *additive spanners*. We study k -detour subgraphs of the n -dimensional cube, Q^n , with few edges or with moderate maximum degree. Let $\Delta_{k,n}$ denote the minimum possible maximum degree of a k -detour subgraph of Q^n . The main result is that for every $k \geq 2$ and $n \geq 21$,

$$e^{-2k} \frac{n}{\ln n} \leq \Delta_{k,n} \leq 20 \frac{n \ln \ln n}{\ln n}.$$

On the other hand, for each fixed even $k \geq 4$ and large n , there exists a k -detour subgraph of Q^n with average degree at most $2 + 2^{4-k/2} + o(1)$. This improves the result of Bass and Sudborough, and Liestman and Shermer. They proved independently that $\Delta_{2,\infty}(n) \leq n/2$. (Received January 15, 2005)