

Hypercubic bipartitions

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Abstract

The maximum number $f(n)$ of edges of an induced subgraph on $n \leq 2^k$ vertices of the k -dimensional hypercube Q_k is given by $f(1) = 0$ and $f(n) = \lfloor n/2 \rfloor + f(\lfloor n/2 \rfloor) + f(\lceil n/2 \rceil)$ for $n > 1$ and starts like: 0, 1, 2, 4, 5, 7, 9, 12, 13, $\dots$. The function f satisfies a more general well-known divide-and-conquer maximin recurrence $f(n) = \max(\min(n_1, n_2) + f(n_1) + f(n_2))$ where the maximum is taken over all proper bipartitions $n = n_1 + n_2$. In this talk we discuss *hypercubic bipartitions* $n = n_1 + n_2$ that yield the maximum value $f(n) = \min(n_1, n_2) + f(n_1) + f(n_2)$ and their number $h(n)$. This is a version of a talk I will give at an AMS Special Session at GWU in October.

Keywords: hypercube, bipartition, divide-and-conquer maximin recurrence.