

Dezso Miklos: *Extremal problems on the hypercube*

Let M be a subset of the vertices of the n -dimensional hypercube (or sometimes a subset of the vertices of the n dimensional hypercube consisting of vertices of weight k , where $1 \leq k \leq n$). We will investigate the question and present a few results about the maximum size of M assuming that the span (convex span) of the vertices in M completely avoids (or does not contain) the hyperplane of the cube consisting of the vertices of weight m , $1 \leq m \leq n$ (where the weight of a vertex is the number of 1 coordinates of it). Interesting connections to other combinatorial questions are shown. E.g. partial answer to this innocent-looking question is given: assume there are n (real) numbers given with a positive sum and consider all k -subsums of them (the sums of any k different of them). At least how many of these subsums will be positive?