Sum-distinguishing number of hypergraphs

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A vertex labeling of a hypergraph is sum distinguishing if it uses positive integers and the sums of labels taken over the distinct hyperedges are distinct. Let $s(H)$ be the smallest integer N such that there is a sum-distinguishing labeling of H with each label at most N. The largest value of $s(H)$ over all hypergraphs on n vertices and m hyperedges is denoted $s(n, m)$. We prove that $s(n, m)$ is almost-quadratic in m as long as m is not too large.

One application of our result is an answer to a question of Gyarfas et al. whether there are n-vertex hypergraphs with irregularity strength greater than $2n$. In fact we show that there are n-vertex hypergraphs with irregularity strength at least $n^{2-o(1)}$.

This is a joint work with Yair Caro and Rafael Yuster.