# BI-UNIFORM PROPERTY B

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How many edges do we need in order to construct a $k$-uniform hypergraph which is not two-colorable? This number, denoted by $m(k)$, has been intensively studied since its introduction by Erdős and Hajnal in 1961. As a result, the lower bounds have been improved a number of times and nowadays we know that $m(k) = \Omega(\sqrt{k/\log(k)}\, 2^k)$ (Radhakrishnan and Srinivasan 2000). The story of the upper bounds is much shorter. Bound $m(k) = O(k^2\, 2^k)$, obtained by Erdős in 1964, has not been improved since.

We are going to discuss what insights can be gained from considering analogous problem for non-uniform hypergraphs. We focus on an interesting class of bi-uniform hypergraphs, i.e. hypergraphs in which there are two allowed sizes of edges. The class is rich enough to observe the most important coloring obstacles caused by non-uniform edges. On the other hand, having only two sizes of edges eliminates a lot of technical difficulties.