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*Color critical hypergraphs and forbidden configurations*

A $k$-uniform hypergraph $(V, E)$ is 3-color-critical if it is not 2-colorable, but for every edge $e$ the hypergraph $(V, E - e)$ is 2-colorable. Lovász proved in 1976 that

$$|E| \leq \binom{n}{k-1}$$

for a 3-color-critical $k$-uniform hypergraph with $n$ vertices.

Here we give a new algebraic proof and prove a generalization that leads to a sharpening of Sauer's bound for $\mathrm{forb}(m, F)$, where $F$ is a $k$-by-$\ell$ $0, 1$-matrix.

Joint work with R. Anstee, B. Fleming, and A. Sali.

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