# Unions of $k$ maximal independent sets

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This problem is originally from Éric Colin de Verdière, Xavier Goaoc and Galatée Hémery.

For a graph $G$ on $n$ vertices, let $\mathcal{M}$ be the family of all maximal independent sets in $G$. Let family $\mathcal{M}^k$ consist of all sets of the form $M_1 \cup \cdots \cup M_k$ with $M_i \in \mathcal{M}$. Is there a constant $\varepsilon_k > 0$ such that $|\mathcal{M}^k| < (2 - \varepsilon_k)^n$ for all $G$ and all $n$?