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Prime 3-uniform hypergraphs

Abstract

Given a 3-uniform hypergraph H, a subset M of $V(H)$ is *a module* of H if for each $e \in E(H)$ such that $e \cap M \neq \emptyset$ and $e \setminus M \neq \emptyset$, there exists $m \in M$ such that $e \cap M = \{m\}$ and for every $n \in M$, we have $(e \setminus \{m\}) \cup \{n\} \in E(H)$. For example, $\emptyset$, $V(H)$ and $\{v\}$, where $v \in V(H)$, are modules of H, called *trivial*. A 3-uniform hypergraph is *prime* if all its modules are trivial. Given a prime 3-uniform hypergraph, we study its prime, 3-uniform and induced subhypergraphs. Our main result is: given a prime 3-uniform hypergraph H, with $v(H) \geq 4$, there exist $v, w \in V(H)$ such that $H - \{v, w\}$ is prime.

This is joint work with Abderrahim Boussaïri, Pierre Ille, and Mohamed Zaidi.

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