

1064-05-19

Amin Bahmanian* (mzb0004@auburn.edu), Department of Mathematics, Auburn University, Auburn, AL 36849. *Detachments of Amalgamated 3-uniform Hypergraphs.*

In this paper we use Nash-Williams lemma on laminar families to prove a detachment theorem for amalgamated 3-uniform hypergraphs, which yields a substantial generalization of previous amalgamation theorems by Hilton, Rodger and Nash-Williams.

To demonstrate the power of our detachment theorem, we show that the complete 3-uniform n -partite multi-hypergraph $\lambda K_{m_1, \dots, m_n}^3$ can be expressed as the union $\mathcal{G}_1 \cup \dots \cup \mathcal{G}_k$ of k edge-disjoint factors, where for $i = 1, \dots, k$, \mathcal{G}_i is r_i -regular if and only if:

- (i) $m_i = m_j := m$ for all $1 \leq i, j \leq k$,
- (ii) $3 \mid r_i m n$ for each i , $1 \leq i \leq k$, and
- (iii) $\sum_{i=1}^k r_i = \lambda \binom{n-1}{2} m^2$,

which yields a generalization of Baranyai theorems for 3-uniform hypergraphs. Our result in particular leads to a polynomial time algorithm for parallelisms, while all other known constructions are of exponential complexity. (Received July 28, 2010)