

# Discrete Mathematics Seminar

Illinois State University

2:00–2:50 pm, November 5

## On Tight 6-Cycle Decompositions of Complete 3-Uniform Hypergraphs

Matthew Akin, Joshua Hamilton, Brittany Kolle,  
Sabrina Lehmann, Levi Neiburger

The complete 3-uniform hypergraph of order  $v$  has a vertex set  $V$  of size  $v$  and the set of all 3-element subsets of  $V$  as its edge set. A tight 6-cycle is a hypergraph with vertex set  $\{a, b, c, d, e, f\}$  and edge set  $\{\{a, b, c\}, \{b, c, d\}, \{c, d, e\}, \{d, e, f\}, \{e, f, a\}, \{f, a, b\}\}$ . We give necessary and sufficient conditions for the existence of a decomposition of the complete 3-uniform hypergraph of order  $v$  into isomorphic copies of a tight 6-cycle.

## On Decompositions of Complete 4-Uniform Hypergraphs into a 2-Regular 4-Cycle

Mariyem Mrani, William Turner, Beth Warden

The complete 4-uniform hypergraph of order  $v$  has a set  $V$  of size  $v$  as its vertex set and the set of all 4-element subsets of  $V$  as its edge set. An example of a 2-regular 4-cycle in such a hypergraph has vertex set  $\{a, b, c, d, e, f, g, h\} \subseteq V$  and edge set  $\{\{a, b, c, d\}, \{c, d, e, f\}, \{e, f, g, h\}, \{g, h, a, b\}\}$ . We give necessary and sufficient conditions for the existence of a decomposition of the complete 4-uniform hypergraph of order  $v$  into isomorphic copies of this 2-regular 4-cycle.

