

Abstract submitted for Thirty-Third Annual Victorian Algebra Conference

Title: Definability of $\mathbb{S}\mathbb{P}$ -classes of uniform hypergraphs

Author(s): Ms Lucy Ham

An $\mathbb{S}\mathbb{P}$ -class of k -uniform hypergraphs is a class of k -uniform hypergraphs closed under taking induced substructures and direct products. The 2-uniform hypergraphs are just the simple graphs. Using results of Erdős and Hajnal, we show that for $k > 2$, no $\mathbb{S}\mathbb{P}$ -class of k -uniform hypergraphs with bounded chromatic number is definable by a single first-order sentence, except in two trivial cases. This result is analogous to one proved by Caicedo for simple graphs (after Erdős, Nešetřil and Pultr), where there are four exceptional cases. We also show that both our result and Caicedo's continue to hold when we restrict to the class of finite uniform hypergraphs, verifying the finite level $\mathbb{S}\mathbb{P}$ -preservation theorem in this case. The finite level $\mathbb{S}\mathbb{P}$ -preservation theorem remains open for arbitrary relational structures.