

Prime labeling some trees, hypergraphs, and random graphs

Arran Hamm¹

Joint work with John Asplund², Justin McCullough¹, Zhiyu Wang⁴, and Alan Way¹

¹) Winthrop University

hamma@winthrop.edu

²) Dalton State College

³) University of South Carolina

Roughly 40 years ago the notion of prime labeling graphs was introduced; a graph on n vertices has a prime labeling if its vertices can be labeled by the numbers $1, 2, \dots, n$ so that each edge spans a coprime pair (with an analogous definition for prime labeling a hypergraph). Thus the problem: given a graph or hypergraph, is there a prime labeling? In this talk, we give a bit of background on the problem and will discuss a couple of our results. First, we use a number theoretic result of S. Pillai to give a prime labeling for a specific family of trees and will mention other potential uses of Pillai's theorem. Second, we show that essentially all tripartite 3-uniform hypergraphs are not prime (and why this may [or may not] be surprising). We will conclude by discussing the associated threshold problem for random graphs and hypergraphs.