

## The Combinatorics of Increasing Graphs

Garrett Southwood\*, Hua Wang, Georgia Southern University

Increasing trees are rooted trees of size  $n$  whose vertices are monotonically labelled  $\{1, \dots, n\}$  where each child has a greater label than its parent. In this talk we will discuss the generating functions of such trees and how coloring the vertices affects the generating function. We will also discuss how this labelling can be applied to graphs and some related results. Then we discuss properties of this labelling and some “optimal” ways in which we may label them and discuss the magnitude sum of trees, letting  $m(e)$  denote the difference in labeling of a vertex  $u$  and its child  $v$ , then we define the magnitude sum as,

$$\sum_{e_i} m(e_i).$$

We will present results on labeling trees according to this sum.

Keywords: Trees, Generating Functions, Enumeration in Graphs, Graph Labelling