

Mathematics Colloquium

Unimodality in graph domination

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4 – 4:50 pm
Building 38, Room 220

Abstract

Graphs are collections of points connected by lines—simple to describe but full of interesting questions. Many graph theorists study “domination” in graphs: how can we choose a set of vertices so that every vertex is either chosen or has a chosen neighbor? This idea connects to networks, optimization, and information spread.

In this talk, we will look at the number of dominating sets of each possible size in a graph. These counts form a sequence that conjecturally has a beautiful unimodal shape: it rises, peaks, and then falls. We will start with the basics of graph theory, work through plenty of examples, and see how an undergraduate REU project proved unimodality for several families of graphs. Based on joint work with Grace O’Brien.

About the speaker: Amanda Burcroff is currently an NSF & School of Science Dean’s Postdoc at MIT, where her research focuses mainly on algebraic combinatorics. In particular, she studies positivity properties in cluster algebras that unify phenomena across mathematics and physics. She completed her Ph.D. at Harvard University under the supervision of Lauren Williams and has previously studied mathematics in England, Hungary, and France. She was also an advisor at the Duluth combinatorics REU for three years.