

Abstracts

Invited Talk: “Integration by Parts and Infinite Series”

Dr. Shelby Kilmer, Missouri State University

We extend integration by parts to produce infinite series and show the series produced are the same as those derived by standard methods.

“K-Chains of Dot Products in Finite Fields and Rings”

Vincent Blevins and Ethan Lynch, Missouri State University

Faculty Mentor: Dr. Steven Senger, Missouri State University

One of the natural questions that appears again and again in geometric combinatorics is this: “how often can a certain configuration appear in a finite set of points?” We explore a variant of this question concerning sequential structures of points known as dot product chains—where each point in the chain has specified dot products with the points immediately before and after it. Specifically, we provide bounds for how many dot product chains can occur in a large, finite subset of a vector space over a finite field or a free module over certain rings.

“Bounds on Point Configurations Determined by Dot Products”

Slade Gunter, Missouri State University

Faculty Mentor: Dr. Steven Senger, Missouri State University

Generalizing the Erdős unit distance problem we concern ourselves with the dot product between pairs of points from a large finite set. Given a large set E of n points, we look for bounds on the number of subsets of k points satisfy a set of relationships between point pairs based on dot products. Reviewing recent work in the area, we will present several new, more general families of bounds.