Department of Mathematics and Statistics

Special Colloquium

Factorizations in Numerical Monoids and Quasi-polynomial Growth

Roberto Pelayo

University of Hawai‘i at Hilo

Abstract: With its multiplicative structure, the monoid of natural numbers is a unique factorization domain. In contrast with this, co-finite, additive submonoids of the natural numbers, called numerical monoids, have elements with plural factorizations into irreducible elements. Understanding factorizations within numerical monoids has led to the development of several factorization invariants, including the delta set and omega-primality. These invariants, which generally measure how far an element is from being uniquely factorable, have garnered significant scholarly interest. Most notably, many recent results demonstrate that these invariants experience eventual quasi-polynomial growth. While this growth is evident in essentially every factorization invariant, we also provide examples of quasi-polynomial growth of invariants of families of numerical monoids, including the Frobenius number and the Apery set.

In this talk, we will present several of our results and their connections to questions in commutative algebra. As many of these results were generated in the Pacific Undergraduate Research Experience in Mathematics (PURE Math), we discuss why these problems are particularly accessible to undergraduates.

Keywords: Ring Theory, Algebra

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