

Algebra & Number Theory Day

October 14th, 2016 at HS 11.02, Heinrichstraße 36

10:00– 10:30 Coffee

10:30– 11:15 Weidong Gao (Nankai University, PR China)

Zero-sum subsequences of distinct lengths

Let G be an additive finite abelian group, and let $\text{disc}(G)$ denote the smallest positive integer t such that every sequence S over G of length $|S| \geq t$ has two nonempty zero-sum subsequences of distinct lengths. We present some recent results and open problems on $\text{disc}(G)$.

11:30– 12:15 Wolfgang A. Schmid (University of Paris 8 & 13, France)

Transfer Krull monoids and weakly Krull monoids: a comparison of their sets of lengths

For a commutative, cancellative monoid H , one says that a positive integer n is a length of $a \in H$ if $a = u_1 \dots u_n$ for irreducible elements $u_i \in H$. The set $L(a) = \{n : n \text{ is a length of } a\}$ is called the set of lengths of a . For various classes of monoids it is known that sets of lengths are almost arithmetical multiprogressions with globally restricted difference and bound. An important class of monoids for which this is true are Krull monoids obeying some algebraic finiteness condition. Two important generalizations of this notion are transfer Krull monoids and weakly Krull monoids. We give an overview of results on sets of lengths of such monoids and then discuss some recent results on this subject, obtained jointly with A. Geroldinger and Q. Zhong. In particular, we identify some phenomena present for weakly Krull monoids (including numerical semigroups) yet not for transfer Krull monoids.

14:00– 14:45 Pedro A. García-Sánchez (University of Granada, Spain):

Numerical Semigroups

Numerical semigroups became an interesting topic at the end of the nineteenth century due to their implication in Diophantine problems, and later in the twentieth century because they are a source of examples of monomial curves with prescribed properties. In the last two decades, they have also been used as an introduction to nonunique factorization problems. We will start with some basic facts on numerical semigroups, and then we will show how numerical semigroups can be represented as free objects modulo a congruence. These presentations will be of particular interest for the study of nonunique factorization invariants.

15:00– 15:45 Salvatore Tringali (University of Graz, Austria):

Unions of Sets of Lengths

For a commutative (not necessarily cancellative) monoid H and for $k \in \mathbb{N}$, let $\mathcal{U}_k(H)$ denote the set of all $\ell \in \mathbb{N}$ having the following property: there are irreducible elements $u_1, \dots, u_k, v_1, \dots, v_\ell$ such that $u_1 \dots u_k = v_1 \dots v_\ell$ (thus $\mathcal{U}_k(H)$ is the union of all sets of lengths containing k). Our goal is to give a characterization when such sets $\mathcal{U}_k(H)$ are almost arithmetical progressions with a global bound for all k . To do so we start with an abstract result in the realm of additive number theory, valid for a suitable defined family of subsets of the nonnegative integers. This abstract result allows us to establish the required characterization for not necessarily cancellative monoids, including semigroups of modules and semigroups of ideals.