THE CONCEPT OF TAMENESS AND SETS OF LENGTHS

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Let H be a Krull monoid with finite class group G. Then every nonunit $a \in H$ can be written as a product of atoms, say $a = u_1 \cdot \ldots \cdot u_k$. The number of atoms, k, is called the length of the factorization, and the set $\mathsf{L}(a)$ of all possible k is the *set of lengths* of a. It is easy to see that all sets of lengths are finite and nonempty. The Structure Theorem for sets of lengths runs as follows: There exist a constant $M(G)$ and a finite subset $\Delta^*(G)$ of the set of distances $\Delta(G)$ such that every set of lengths is an AAMP (almost arithmetical multiprogression) with difference $d \in \Delta^*(G)$ and bound $M(G)$. Whereas the set $\Delta^*(G)$ has been studied a lot by Chapman, Hamidoune, Plagne, Smith, Schmid and others, almost nothing is known about the constant $M(G)$. The proof of the Structure Theorem reveals a canonical upper bound for $M(G)$ in terms of certain tame degrees. It will be the aim of the talk to outline this relationship.

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