

Mathematical Colloquia

Monday, 18 November 2019

17:15 h, Lecture Room 119

Dr. Daniel Wessel, University of Verona

Ideal objects in the shades of finite trees

Abstract:

Transfinite methods abound in abstract algebra but tend to obscure computational content when used to prove concrete, finitary statements. Syntactical considerations often help to address such concerns and are part and parcel of a revised Hilbert programme that has seen considerable success in commutative algebra. The aim of this talk is to discuss and illustrate some of the results, ideas and phenomena.

As a case study, we will concentrate on a form of Krull's lemma, asserting that a multiplicative subset of a commutative ring contains the zero element precisely if the set in question meets every prime ideal. We attempt a constructive interpretation by relating the Zariski lattice to a certain inductively generated class of finite binary trees.

The well-known theorem that every nonconstant coefficient of an invertible polynomial is nilpotent, which via Krull's lemma admits an elegant proof by reduction to the integral case, serves as an acid test, and we spot a straightforward elementary argument. We will then take a step back to throw a more conceptual glance at the method.

The research presented in this talk is based on joint work with Peter Schuster (University of Verona) and Ihsen Yengui (University of Sfax).