ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

Invitation to the Lecture on the Habilitation Project

Dr. Roswitha Rissner
Universität Klagenfurt

"Understanding algebraic structure changes when raising to a power"

N.2.35 | Wednesday, 14 June 2023 | 10:00 a.m.

Abstract

While algebraic structures are the main objects of study of modern algebra, they are present in many mathematical disciplines. This has not only been a thriving force for the development of the field of algebra itself, it has also led to additional perspectives in other fields by focusing on structural similarities. It allows one to translate and adopt methods and tools from different mathematical fields which are based on the given structure.

In this context, structural decompositions are typically used to characterize objects of interest in terms of their "building blocks" as well as the reduction of questions to potentially easier-to-handle cases. The factorization of integers into prime powers, polynomials into irreducible factors, and the decomposition of algebraic varieties into their irreducible components are only some of many structural decompositions.

The objects of interest in this talk are irreducible elements (that is, they themselves are indecomposable building blocks) but some of their powers

have other, in some sense unexpected, building blocks. To be more precise, there are structure in which is possible that an irreducible element c has a power c^k which can be decomposed in a different way than the obvious one, that is, $c \cdot c \cdots c$. Understanding the factorization behavior of irreducible elements is crucial when it comes to fully understand the arithmetic in a structure that allows non-unique factorization of elements.
This talk provides an overview on these factorization-theoretic questions with focus on absolutely irreducible elements in rings of integer-valued polynomials. These structures are well-known for their rich non-unique factorization behavior. In particular, they are known to provide both examples for irreducible elements whose powers factor uniquely (*absolutely irreducibles*) and irreducible elements some of whose powers have different factorizations.

Angelika Wiegele and the Department of Mathematics look forward to seeing you at the talk!