Leibniz Universität Hannover

SEMINAR ANNOUNCEMENT

Prof. Dr. Caroline Lassueur

Summer Semester 2025

Wed. 12:15-13:45, room A410

Seminar Cohomology of Finite Groups
SoSe 2025

Short description:
The aim of this seminar is to introduce the so-called *cohomology groups* associated to a finite group. In particular, we will study the connections between the short exact sequences of groups of the form $1 \longrightarrow A \longrightarrow E \longrightarrow G \longrightarrow 1$ with abelian kernel and the cohomology of the group G (with coefficients in A). Such methods are particularly interesting because they provide us with a powerful tool to classify finite groups of a given order up to isomorphism. The topic has many other applications in modern mathematics, for example in number theory or algebraic geometry. Historically, it lies at the interplay between group theory, module theory and algebraic topology.

$$\begin{array}{ccccccccc} 1 & \longrightarrow & Z & \longrightarrow & E & \xrightarrow{\pi} & G & \longrightarrow & 1 \\ & & \downarrow{\scriptstyle \lambda|_Z} & & \downarrow{\scriptstyle \lambda} & & \downarrow{\scriptstyle \theta} & & \\ 1 & \longrightarrow & K^\times \cdot \mathrm{Id}_V & \longrightarrow & \mathrm{GL}(V) & \xrightarrow{\pi_V} & \mathrm{PGL}(V) & \longrightarrow & 1 \end{array}$$

Module: Seminar, BA Mathematik and MA Mathematik

Registration and questions: via e-mail, lassueur@math.uni-hannover.de

Time/Room: a priori Wednesdays, 12:15-13:45, room 1101-A410

Introduction + topic distribution: on Wednesday, 9th of April 2025

Pre-requisites: Linear Algebra I/II and Algebra I (part on group theory).
Knowledge in module theory/representation theory can be helpful, but is not mandatory.

Language: English/German (to be decided at the beginning of the seminar)

References:

[Bro94] K. S. Brown. *Cohomology of groups*. Vol. 87. Graduate Texts in Mathematics. Springer-Verlag, New York, 1994.

[CR90] C. W. Curtis and I. Reiner. *Methods of representation theory. Vol. I*. Wiley Classics Library. John Wiley & Sons, Inc., New York, 1990.

[Las21] C. Lassueur. *Cohomology of groups*. Lecture Notes SS21. TU Kaiserslautern, 2021.

[Rot95] J. J. Rotman. *An introduction to the theory of groups*. Fourth. Vol. 148. Graduate Texts in Mathematics. Springer-Verlag, New York, 1995.