Abstract

Oberwolfach Workshop:

Field Arithmetic

Dates:

3 Jun - 9 Jun 2018 (Code: 1823a)

Organizers:

Lior Bary-Soroker (Tel Aviv)
Florian Pop (Philadelphia)
Jakob Stix (Frankfurt)

Field Arithmetic emerged from Ax' study of the elementary theory of finite fields in the late 1960's. During the 1980s-90s the area rapidly expanded, involving methods from a wide range of areas, e.g., number theory, arithmetic geometry, rigid/formal geometry, model theory, profinite group theory, etc. For instance, several forms of patching were developed (Harbater, Liu, Pop, Haran–Jarden, Paran, Harbater–Hartmann). Among other things, prominent outcomes of these developments were the theory of large fields and the affirmative solution of the Regular Inverse Galois Problem over large fields by Pop; further, the strong local-global principles over totally S-adic fields (Moret-Bailly and Green, Pop, Roquette). Beyond Galois theory, these local-global principles are, among other things, a key step in Taylor's potential modularity theorem.

In recent years, the study in Field Arithmetic focuses on absolute Galois groups and their cohomology, e.g., local-global principles with application in arithmetic/algebraic geometry, quadratic forms, structure of algebras and Brauer group, inverse Galois theory, the theory of specialization à la Hilbert, anabelian geometry, e.g., Grothendieck's (birational) section conjecture, and model theory of (valued) fields. For example, Koenigsmann applied model theory to prove the birational p-adic section conjecture, and recently Stix proved the birational p-adic section conjecture in higher dimensions. Further, using Ax' original works, Field Arithmetic found applications in arithmetic statistics over finite fields. For example, Bary-Soroker and Bender, and Pollack resolved a function field version of the twin prime conjecture.

The conference will foster exchange of ideas between the experts working on the wide range of open problems related to Field Arithmetic.