Reg. No: 2016/21/N/ST1/01465; Principal Investigator: mgr Daniel Maksymilian Hoffmann

Model-theoretic and algebraic properties of separably closed G-fields

Daniel Max Hoffmann

Like a biographer is much more interested in a personage of a famous mathematician than in his discoveries, so mathematical logic is much more interested in mathematical theories than their objects. In other words, mathematical logic is a meta-science. It divides into four branches, and model theory is one of it. Research proposed in this project is in the field of model theory. Model theory studies properties of sets of sentences and structures, in which these sentences are true. A structure, in which all sentences belonging to a given theory are true, is called model of this theory. Such a model may be set of rational numbers considered with addition and multiplication.

Certainly properties owed by elements of a model are connected with properties of the model. For such reason, model theory developed methods of analysis of so-called types of elements, i.e. all sentences true about a given element (for us, elements of the same type are indistinguishable). One of the main tasks of the project is to investigate which types - for some mathematical theory - are "very thin". This theory is the theory of separably closed fields in positive characteristic. Models of the above theory are sets equipped with some abstract addition and multiplication, which satisfy additional algebraic conditions, i.e. conditions expressed only by addition and multiplication.

The theory of separably closed fields was been already studied, but in the project we propose a new approach. As it turns out, in a separably closed field (that is, in that set with addition and multiplication) it is possible to interpret some mappings, which behave similarly to, otherwise known, derivations. There are many ways to define those abstract derivations, our research posits to make use of this multifariousness. There is probably nothing surprising in the fact that the manifestation of such objects as derivations stems from more fundamental properties of the theory of separably closed fields, properties that we want to examine.