AX-KOCHEN/ERSHOV PRINCIPLES AND THEIR APPLICATIONSS

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Abstract

Abstract: A classical theorem in model theory of valued fields, proven independently by Ax-Kochen and Ershov, allows to reduce the complete theory of a henselian valued field of equicharacteristic 0 to that of its value group and residue field. This gives in particular an asymptotic transfer between the p-adic numbers and power series fields $F_p((t))$ in positive characteristic. In the first lecture, I will discuss this classical transfer theorem and some of its generalizations. In the second lecture, I will discuss recent joint work with Konstantinos Kartas how these principles can adapted to perfectoid fields, which gives a method of determining which first order properties tilt and untilt. In particular, our approach yields a simple model-theoretic proof of the Fontaine-Wintenberger Theorem.