

ON IMMEDIATE EXTENSIONS OF VALUED FIELDS

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The connection between a valued field extension and the corresponding extensions of the value group and the residue field is meaningful for the theory of valued fields. When this connection is interrupted, the structure of valued field extensions is much more complicated. Crucial examples of this situation are immediate extensions of valued fields. A better understanding of such extensions turned out to be important for questions in algebraic geometry, real algebra and the model theory of valued fields.

We present results which describe the structure of maximal immediate extensions of valued fields. We give conditions for a valued field to admit maximal immediate extensions of infinite transcendence degree. We further answer the question when an infinite algebraic extension (L, v) of a maximal field (K, v) can be again maximal and discuss the possible form of the maximal immediate extensions of (L, v) if it is not maximal.

We also investigate the problem of uniqueness of maximal immediate extensions. We prove in particular that there is a class of valued fields which admit an algebraic maximal immediate extension as well as one of infinite transcendence degree, which can be seen as the worst possible case of non-uniqueness.

This is joint work with Franz-Viktor Kuhlmann