

Valued difference fields

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Abstract

Let (K, v) be a valued field with a distinguished automorphism σ which preserves the valuation ring \mathcal{O}_K , hence inducing automorphisms: σ_v on the ordered value group of (K, v) and $\bar{\sigma}$ on the residue field of (K, v) . In [1], S. Durhan (formerly S. Azgin) considered the case where σ_v is contractive ($\sigma_v(\gamma) > n\gamma \quad \forall \gamma > 0$ and $\forall n \in \mathbb{N}$); in [3], K. Pal considered the case where σ_v is multiplicative ($\sigma_v : \gamma \mapsto \rho\gamma$, for some $\rho > 0$ in some real closed field) while my thesis (cf. [2]) involves study of σ -linear equations (i.e. equations of the form $\sum_i a_i \sigma^i(x) = b$), where σ_v is auto-increasing ($\sigma_v(\gamma) > \gamma$ for $\gamma > 0$).

In this talk, after recalling these results, I will present some new ones on the way of Ax-Kochen and Ershov type theorems which permit one to recognise the first order theory of the *valued difference field* (K, v, σ) by those of its value group and residue field **with no assumption on** σ_v while keeping already present hypotheses in above works on residue field. This is an ongoing work *joint with* Salih Durhan.

References

- [1] S. AZGIN. Valued fields with contractive automorphism and Kaplansky fields. *Journal of Algebra* **324**(10), 2757–2785 (2010).
- [2] G. ONAY. “Modules valués: en vue d’applications à la théorie des corps valués de caractéristique positive”. Thèse de doctorat, Université Paris VII, France (2011).
- [3] K. PAL. Multiplicative valued difference fields. *J. Symbolic Logic* **77**, 545–579 (2012).