

On differential Galois groups of strongly normal extensions

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This work deals with strongly normal extensions, introduced by Kolchin [2]. These extensions generalise Picard-Vessiot and Weierstrass extensions. Kolchin proved that the differential Galois group of a strongly normal extension L of K is isomorphic to an algebraic group over the field of constants C_K of K . Most of the well known results on strongly normal extensions are proved assuming C_K is algebraically closed, notably, the correspondence between the intermediate extensions and the algebraic subgroups of the differential Galois group of L/K .

We consider strongly normal extensions L/K , without assuming that C_K is algebraically closed. For instance, the cases $C_K = \mathbb{R}$ or $C_K = \mathbb{Q}_p$ are studied. Our purpose is to extend or adapt the results proved by Kolchin to this context. We state a weaker version of the correspondence and we give an example emphasizing the fact that the correspondence given by Kolchin fails in that case. Some of our proofs use the methods of model theory (see for instance [3]).

The results of this work are in the preprint paper [1].

References

- [1] Q. BROUETTE AND F. POINT, On Galois groups of strongly normal extensions, <http://arxiv.org/abs/1512.05998>
- [2] E. R. KOLCHIN, *Differential algebra and algebraic groups*. Pure and Applied Mathematics, Vol. 54., Academic Press, New York-London, 1973.
- [3] A. PILLAY, Differential Galois Theory I, *Illinois Journal of Mathematics*, **volume 42** (1998), no. 4, 678 – 699.

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