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On Topological Exponential Differential Fields

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Question: Does $Th(\mathbb{R}, <, exp, D)$, the theory of the real ordered field with exponentiation and derivation, have a model-completion?

To answer it, we work in a more general setting, dealing with topological fields of caracteristic 0 with an exponential subring on which the exponential is continuous. These structures, which we equipp with an exponential derivation D on which there isn't any continuity hypothesis, also encompass the p-adics endowed with a valuation and a partially defined exponential.

References

[1] Wilkie,A. *Model completeness results for expansions of the ordered field of real numbers by restricted Pfaffian functions and the exponential function*,J. Amer. Math. Soc. 9 (1996), 1051-1094.

[2] Mariaule,N. *On the decidability of the p-adic exponential ring*[Thesis]. Manchester, UK: The University of Manchester; 2013.

[3] Guzy,N. & Point, F. *Topological Differential Fields*, Annals of pure and applied logic 161 (2010) 570-598.

[4] Macintyre,A. & Marker,D. & van den Dries,L. *Logarithmic-exponential Power Series*, J. London Math. Soc. (1997) 56 (3): 417-434.

[5] Kuhlmann,S. & Kuhlmann,F.-V. & Shelah,S. *Exponentiation in power series fields*, Proceedings of the American Math. Society, Volume 125, Number 11, November 1997, 3177-3183.

[6] Kirby,J. *Exponential Algebraicity in Exponential Fields*, Bull. London Math. Soc. 42 (2010) 879-890.

[7] Pierce,D. & Pillay,A. *A Note on the Axioms for Differentially Closed Fields of Characteristic Zero*, Journal of Algebra, Volume 204, Issue 1, 1 June 1998, Pages 108-115.

[8] Guzy,N. & Point, F. *Topological Differential Fields and Dimension Functions*, The Journal of Symbolic Logic Volume 77, Number 4, Dec. 2012.

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