Composition of transseries, monotonicity, and analyticity

Vincenzo Mantova

Transseries generalise power series by including exponential and logarithmic terms, if not more, and can be interpreted as germs of a non-standard Hardy field by composition (for instance, on surreal numbers). I'll discuss a few results that must 'obviously' be true, yet their proofs are not obvious: that composition is monotonic in both arguments, only proved by Edgar for LE-series, that it satisfies a suitable Taylor theorem and that in fact composition is 'analytic with large radius of convergence' (joint with V. Bagayoko), something which appeared before in various special forms, but not in full generality. I'll discuss briefly what I cannot prove yet (convexity!). I'll show how monotonicity and Taylor can be used to prove some fairly general normalisation results for hyperbolic transseries (joint with D. Peran, J.-P. Rolin, T. Servi).