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P-minimality and p-adic integration

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A celebrated result of Igusa establishes that given a polynomial $f(x) \in \mathbb{Z}[x]$, its associated Poincaré series $P_f(T)$ is rational. Here $P_f(T)$ denotes the series $\sum_{m \in \mathbb{N}} N_m T^m$ where

$$N_m := \#\{x \in (\mathbb{Z}/p^m\mathbb{Z})^n \mid f(x) \equiv 0 \mod p^m\}.$$

In [4], Denef gave an alternative proof for this result by translating the original problem into a problem about p-adic integration. The main part of his strategy consists in showing that a certain algebra of functions called "constructible functions" is stable under integration. His ideas were generalized to different classes of functions, obtaining rationality results for new Poincaré series (cf. [1, 2]). In this talk I will discuss a generalization of this result to P-minimality, a p-adic analog of o-minimality. This is a joint work with Eva Leenknegt [3].

References

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