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Germes of arcs on singular algebraic varieties and motivic integration. (English)

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Invent. Math. 135, No. 1, 201-232 (1999).

In this paper the authors prove a motivic analogue of the rationality of the Poincaré series associated to the p -adic points on algebraic varieties. They consider the Grothendieck ring on algebraic varieties over a field of characteristic 0: The class of a variety S is the sum of the classes of S' and S'' if S' is closed in S and S'' is isomorphic to $S - S'$. The multiplication is the product of varieties and the ring they consider is a certain subring of the localization of the above Grothendieck ring where multiplication by the affine line is made invertible. The Poincaré series is viewed as an element of the formal power series ring in one variable over the above ring. The main techniques used in the proof are quantifier elimination for semi-algebraic sets of power series in characteristic 0 and M. Kontsevich's idea of motivic integration.

Reviewer: Roy Joshua (Columbus)

MSC:

[14E18](#) Arcs and motivic integration

[14E15](#) Global theory and resolution of singularities (algebraic-geometric aspects)

[14B05](#) Singularities in algebraic geometry

[14P10](#) Semialgebraic sets and related spaces

[03C10](#) Quantifier elimination, model completeness, and related topics

[13D40](#) Hilbert-Samuel and Hilbert-Kunz functions; Poincaré series

[14F42](#) Motivic cohomology; motivic homotopy theory

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Keywords:

motivic integration; rationality of the Poincaré series; p -adic points; quantifier elimination; semi-algebraic sets

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