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Solution algebras of differential equations and quasi-homogeneous varieties

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We develop a new connection between Differential Algebra and Geometric Invariant Theory, based on an anti-equivalence of categories between solution algebras associated to a linear differential equation (i.e. differential algebras generated by finitely many polynomials in a fundamental set of solutions), and affine quasi-homogeneous varieties (over the constant field) for the differential Galois group of the equation.

Solution algebras can be associated to any connection over a smooth affine variety. The spectrum of a solution algebra is an algebraic fiber space over the base variety, with quasi-homogeneous fiber. We also discuss the relevance of this result in Transcendental Number Theory.

Subjects: **Algebraic Geometry (math.AG)**

MSC classes: 12H05, 14M17, 14L24, 11J81

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