

Exponentially algebraic solutions of algebraic differential equations

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One of the oldest problem in differential algebra is to classify the algebraic solutions of a given differential equation. When the equation is linear, the differential Galois theory developed since Picard and Vessiot provides a complete decision procedure for this problem. When the equation is only algebraic, such a classification can be achieved for several interesting equations but no general decision procedure is known.

I will discuss a variant of this problem where the algebraic functions are replaced by “exponentially algebraic” functions, that is, holomorphic functions which can be defined in the o-minimal structure obtained by expanding semialgebraic geometry with the restricted complex exponential.

This is a report on joint work with Jonathan Kirby.