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Algorithms beyond the holonomic universe

A function is called holonomic or D -finite, if it satisfies a linear differential equation with polynomial coefficients. It is well known that D -finite functions are closed under certain operations that can be implemented and used to automatically prove identities on D -finite functions. We introduced the notion of DD -finite functions that satisfy linear differential equations with D -finite function coefficients and showed that also this class satisfies several closure properties. This construction can be iterated, yielding D^n -finite functions. In this talk, we report on what is currently known about these extensions. This is joint work with Antonio Jiménez Pastor.