

Power series formulas with m -fold hypergeometric term coefficients

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Power series remain the best tool for effective evaluations of combinations of elementary functions. We overview a recent result concerning the symbolic computation of univariate formal power series.

Given a field K , of characteristic zero, a term $a(n)$ is called m -fold hypergeometric for a positive integer m (mostly $m > 1$), if the ratio $a(n+m)/a(n)$ is rational in $K(n)$. When the value of m is not specified, the phrase “ m -fold hypergeometric terms” denotes all such terms. Several power series formulas are simplified when rewritten with m -fold hypergeometric term coefficients. Moreover, some other power series cannot be computed automatically without using m -fold hypergeometric terms. We present an algorithm that converts holonomic functions into power series with m -fold hypergeometric term coefficients, whenever such coefficients exist.

We demonstrate this result using our implementation in the computer algebra system Maple.

This is joint work with Wolfram Koepf.

Presenter: TEGUIA TABUGUIA, Bertrand (Universität Kassel / Max Planck Institute for Mathematics in the Sciences)

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