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Effective Enumeration and Computer Algebra

The field of analytic combinatorics studies the asymptotic behaviour of sequences through analytic properties of their generating functions. In addition to the now classical univariate theory, recent work in the study of analytic combinatorics in several variables (ACSV) has shown how to derive asymptotics for the coefficients of certain D-finite functions by representing them as diagonals of multivariate rational functions. This poster describes the rich theory of ACSV from a computer algebra viewpoint, highlighting the first fully rigorous algorithm and complexity results. Applications to combinatorics (lattice path enumeration) and number theory (asymptotics of binomial sums related to irrationality proofs) are discussed.