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Automating multivariate asymptotics - recent progress. Preliminary report.

The current project of the mvGF group (P., Wilson, Raichev, DeVries and others) is implementation of code that produces asymptotic formulae for the coefficients of multivariate rational generating function F = P/Q.

It is well known that coefficient asymptotics depend mainly on the geometry of the algebraic surface Q=0. One of the challenges in moving from theorems, which handle most cases in practice, to automated asymptotics is to combinatorialize the geometric data. A principal step is to compute a cell complex. Some new homotopy methods are required to deal effectively with algebraic schemes, e.g., storing and manipulating algebraic numbers without floating point.

This talk concerns some of the infrastructure necessary to carry out the combinatorialization. A completely automated and rigorous algorithm for the standard bivariate case is described in a forthcoming paper (DeVries, van der Hoeven + P. 2010). (Received August 03, 2010)