1062-05-186 **Timothy DeVries*** (tdevries@math.upenn.edu), Department of Mathematics, University of Pennsylvania, 209 S. 33rd Street, Philadelphia, PA 19104-6395, and **Robin Pemantle** and **Joris van der Hoeven**. *Automatic Asymptotics in the Bivariate Rational Case.* Preliminary report.

We present an algorithm for producing asymptotic formulae for the coefficients of a wide class of bivariate rational generating functions $F = P/Q$.

Starting with Cauchy's integral formula for coefficient extraction, we discuss how to reduce to a residue integral along the singular variety where $Q = 0$. By a Morse-theoretic decomposition of the singular variety we construct an equivalent integral amenable to the techniques of saddle point analysis. The algorithm we present then captures the salient points of this singular set decomposition and automates the process of passing from Cauchy's formula to saddle point methods, which yield the desired asymptotic formulae. (Received August 07, 2010)