1125-68-1087 **Erdal Imamoglu*** (eimamogl@math.fsu.edu) and **Mark van Hoeij** (hoeij@math.fsu.edu).

Computing Hypergeometric Solutions of Second Order Linear Differential Equations using Quotients of Formal Solutions and Integral Bases.

We present an algorithm for computing hypergeometric solutions of a second order linear differential operator L with rational function coefficients. Our algorithm searches for solutions of the form

$$\exp(\int r\,dx)\cdot(r_0\cdot {}_2F_1(a_1,a_2;b_1;f)+r_1\cdot {}_2F_1{}'(a_1,a_2;b_1;f))$$

where $r, r_1, r_2, f \in \overline{\mathbb{Q}(x)}$, and $a_1, a_2, b_1 \in \mathbb{Q}$. Our algorithm has two components. The first tries to simplify L using normalized integral bases. The goal is to reduce r_1 to 0. The second component tries to find a_1, a_2, b_1, f using quotients of formal solutions, modular reduction, Hensel lifting, and rational reconstruction. (Received September 15, 2016)