Expansions of Solutions to an ODE system

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Abstract

We consider a system of ordinary differential equations of a very general form. Methods and algorithms of Power Geometry [1] allow to find all asymptotic power expansions of its solutions of the following types:

(i) power (with constant coefficients);

(ii) power-logarithmic (coefficients are polynomials in logarithms);

(iii) complicated (coefficients are power series in logarithms, may be multiple).

Computer algebra is very useful for computation of the expansions. We will discuss problems arising in the computation. Except that, we will consider a connection between the normal form of an ODE system and properties of expansions of solutions to the system.

1. A.D. Bruno, Power Geometry in Algebraic and Differential Equations; Amsterdam, Elsevier, 2000. 385 p.