

M A T H E M A T I C A L P H Y S I C S S E M I N A R

Rutgers University
Hill Center - Room 705

Asymptotics of the General Solutions of ODEs in $\mathbb{C}$

Ovidiu Costin, the Ohio State University
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Abstract

In nonlinear differential equations, the existing asymptotic theory only deals with solutions that can be described perturbatively, for instance those that are close to explicit ones, or to solutions of some approximating linear equation. Solutions that fall in this category typically form a lower dimensional manifold in the phase space, and in many applications the general solution is needed.

We introduce a new method, combining exponential asymptotic and KAM ideas, to characterize all the solutions of generic first and second order nonlinear equations. As one application, we look at connection problems for integrable systems.

[Work in collaboration with R. D. Costin (Ohio State) and M. Huang (U. Chicago)]