

Algebraic moments: from Abel equations to Jacobian conjecture

JEAN-PIERRE FRANCOISE

Université P.-M. Curie, Paris 6, Laboratoire Jacques-Louis Lions, UMR 7598 CNRS, 4 Place Jussieu, 75252 Paris, France

E-mail: Jean-Pierre.Francoise@upmc.fr

The classical Hilbert's 16th problem on limit cycles of polynomial vector fields impulsed interest in 1-dimensional non autonomous systems with Abel equations.

In the setting of Abel equations, perturbation theory yields the algebraic moment problem (posed by M. Briskin, Y. Yomdin and JPF). The generic case was first solved by C. Christopher and the full problem was latter solved by Pakovich and Muzychuk. Related problems appeared in other fields of mathematics. A similar problem in representation theory was posed by O. Mathieu. The general form of Mathieu conjecture implies the Jacobian conjecture. An important special case has been solved by Duistermaat and van der Kallen. Recently W. Zhao proposed several extensions of Mathieu conjecture related with powers of differential operators and orthogonal polynomials. The talk will be based on possible extensions to any dimensions of the algebraic moment problem as developed in [1].

References

- [1] J. P. François, F. Pakovich, Y. Yomdin, W. Zhao. *Moment vanishing problem and positivity: some examples*, Bull. Sci. Math. **135** (2011), n.1, 10–32.