The algebraic moments problem and its extensions

(Talk)

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The global analytic and complex version of Bautin theory was studied about 20 years ago in relation with Hilberts 16th problem on limit cycles. Related questions on Abel equations unveiled the algebraic moments problem (Briskin-Françoise-Yomdin). This problem has been completely solved recently by Pakovich and Muzychuk (2009). Related problems appeared indeed in a priori unrelated subjects. For us, initially it was posed in the context of polynomial ordinary differential equations. A similar problem was posed in relation with representation theory by O. Mathieu. The general form of Mathieu conjecture implies the Jacobian conjecture and special cases have been proved by Duistermaat and van der Kallen. W. Zhao provided new extensions of Mathieu conjecture related with powers of differential operators and orthogonal polynomials. In this talk, I will present first the generic situation of the 1-dimensional case (solved by C. Christopher) and then discuss possible extension s to any dimensions of the algebraic moments problem [cf the article J.P. Françoise, F. Pakovich, Y. Yomdin and W. Zhao, Moment vanishing problem and positivity: Some examples. Bull. Sc. Maths. 135, 10-32 (2011).]

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