

SEMINÁRIO DO GRUPO DE FÍSICA MATEMÁTICA

Dia 9 de Novembro (sexta-feira), às 11h00, sala 6.2.33

Some algebraic aspects of multiple orthogonality

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Abstract:

The study of polynomial sets fulfilling specific orthogonal conditions towards d given positive measures on the real line, μ_1, \dots, μ_d , was particularly developed in the most recent decades by many mathematicians such as E. M. Nikishin, V. N. Sorokin, M. de Bruin, A. Aptekarev, W. Van Assche, J. Van Iseghem and P. Maroni. The different approaches followed in their contributions gave rise to the notions of *Type I multiple orthogonal polynomials*, *Type II multiple orthogonal polynomials* [1-2] and *d-orthogonal polynomial sequences* [3-4].

In this talk we will review those notions and recall the connection between the *d-orthogonal sets* and the *Type II multiple orthogonal polynomials*. The main characterisations of a *d-orthogonal polynomial sequence* and the classical case will be revisited along with some important examples. We will also present a joint work with P. Maroni regarding differential relations fulfilled by *d-orthogonal polynomial sets* established by a generic operator.

Main references

- [1] W. Van Assche, *Nearest neighbor recurrence relations for multiple orthogonal polynomials*, J. Approx. Theory 163 (2011) 1427-1448.
- [2] J. Coussement and W. Van Assche, *Differential equations for multiple orthogonal polynomials with respect to classical weights: raising and lowering operators*, J. Phys. A: Math. Gen. 39 (2006) 3311-3318.
- [3] K. Douak and P. Maroni, *Les polynômes orthogonaux "classiques" de dimension deux*, Analysis 12 (1992), pp. 71-107.
- [4] P. Maroni, *L'orthogonalité et les récurrences de polynômes d'ordre supérieur à deux*, Ann. Fac. Sci. Toulouse 10(1), (1989), 105-139.