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Seminar
Systems and Control Group - CIDMA

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Departamento de Matemática, Universidade de Aveiro
Auditório Sousa Pinto

Semiclassical orthogonal polynomials and an application involving an electrostatic model

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Abstract

Abstract. In this talk we consider orthogonal polynomials (OP) via polynomial mappings in the framework of the semiclassical class. In particular, we analyze in detail cubic transformations for semiclassical OP of class at most 2, giving new examples of semiclassical OP of class 2 and providing integral representations for the regular functionals with respect to which these new semiclassical families are orthogonal. Furthermore, we derive in an unified way old and new properties concerning the sieved ultraspherical polynomials of the first and of the second kind, introduced by W. Al-Salam, W. R. Allaway, and R. Askey. This allow us to derive infinitely many examples of semiclassical functionals such that the pair of polynomials appearing in the corresponding canonical Pearson-type distributional differential equation is non-admissible. Finally, we present an application involving an electrostatic model. The results presented are joint work with K. Castillo and J. Petronilho (from University of Coimbra).

References:

[1] K. Castillo, M.N. de Jesus, and J. Petronilho: On semiclassical orthogonal polynomials via polynomial mappings II: Sieved ultraspherical polynomials revisited. (Submitted.)
[2] K. Castillo, M.N. de Jesus, and J. Petronilho: On semiclassical orthogonal polynomials via polynomial mappings, J. Math. Anal. Appl. 455 (2017) 1801-1821.
[3] M.N. de Jesus and J. Petronilho: On orthogonal polynomials obtained via polynomial mappings, J. Approx. Theory 162 (2010) 2243-2277.

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