

SEMINARIO DE ANÁLISIS Y APLICACIONES

Viernes, 9 de marzo de 2018

11:30 h., Módulo 17 - Aula 520 (Depto. Matemáticas UAM)

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Factoring non-negative matrix valued trigonometric polynomials in two variables

Resumen:

The Fejér-Riesz theorem states that a non-negative trigonometric polynomial is the hermitian square of an analytic polynomial of the same degree. Rosenblum showed that the theorem is still valid if the coefficients are Hilbert space operators. The speaker later extended this to strictly positive operator valued trigonometric polynomials in finitely many variables. Results in real algebra due to Scheiderer imply that scalar valued non-negative trigonometric polynomials in two variables always factor as a finite sum of squares of analytic polynomials, and that this fails in three or more variables. We discuss a purely analytic approach, using Schur complement techniques, to showing that any non-negative matrix valued trigonometric polynomial in two variables is a finite sum of squares of analytic polynomials. In analogy with the Tarski transfer principle in real algebra, the proof lifts the problem to an ultraproduct, solves it there, and then shows that this implies the existence of a solution in the original context. While the method is non-constructive, it nevertheless implies a concrete algorithm for such a factorization.

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