# Seminario de Análisis y Aplicaciones

## Miércoles, 1 de junio de 2011

**10:00 h.**, Módulo 17 (antiguo C-XV) - Aula 420 (Depto. Matemáticas UAM)

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### The Dirichlet problem for ellipsoids and cones and rationality of zeros of Jacobi polynomials

**Resumen**:

The Dirichlet problem for ellipsoids can be solved in an elementary way based on a polynomial approach avoiding the Poisson kernel. The method is based on so-called Fischer decompositions of polynomials. In this talk we shall present this method and discuss the validity of the Khavinson-Shapiro conjecture for a bounded domain $\Omega$: if for any polynomial $f$ the solution $u_f$ of the Dirichlet problem for $f \mid \partial\Omega$ has an extension to a holomorphic function on $\mathbb{C}^d$ then $\Omega$ is an ellipsoid.

In the second part of the talk we discuss the Dirichlet problem for a cone given by the equation

$$x_1^2 + ... + x_{d-1}^2 \leq \frac{1 - \gamma^2}{\gamma^2} x_d^2$$

for $\gamma \in (0, 1)$. Solvability of the Dirichlet problem depends on the question whether $\gamma$ is not a zero of the Jacobi polynomials. At the end of the talk we address the problem whether Jacobi polynomials may have rational zeros.