

SEMINARIO DE ANÁLISIS Y APLICACIONES

Viernes, 14 de febrero de 2014

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

Thomas Kühn

Universität Leipzig

Approximation numbers
of Sobolev embeddings -
Sharp constants and tractability

Resumen:

I will discuss optimal linear approximations of functions in periodic Sobolev spaces of fractional smoothness $s > 0$ on the d -dimensional torus, where the approximation error is measured either in the L_2 -norm or in the sup-norm. Both isotropic spaces $H^s(\mathbb{T}^d)$ and spaces of dominating mixed smoothness $H_{\text{mix}}^s(\mathbb{T}^d)$ will be considered. In other words, approximation numbers of embeddings of these spaces into L_2 or L_∞ are investigated. The asymptotic rate of the approximation numbers - up to multiplicative constants - is well known, but very little is known about the 'hidden' constants. The main emphasis in this talk will be on the dependence of these constants on the dimension. For any fixed smoothness $s > 0$, their exact behaviour as $d \rightarrow \infty$ is determined. Moreover, motivated by numerical issues, some explicit error estimates for low-rank approximations are given. Finally, connections to tractability (in the sense of information-based complexity) are pointed out.

The talk is based on two recent joint papers and some work in progress with Winfried Sickel (Jena) and Tino Ullrich (Bonn).