basque center for applied mathematics

Working Seminar
(APDE–Harmonic Analysis)

Wednesday, January 23rd, 17:00

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CHARACTERIZATION OF SOBOLEV SPACES ON THE SPHERE

Given the smoothness index $\alpha\in\mathbb{R}$, we give two characterizations of the Sobolev space H^α on the unit sphere $\mathbb{S}^{d-1}$. The first one is obtained via the L^2 boundedness of a quadratic \emph{multiscale} operator, that in the particular case $0<\alpha<2$, is a square function. This characterization is based on [1]. The second characterization is in terms of the entire solutions of the Helmholtz equation. The result is motivated by [2] and [3]. This is a joint work with J. A. Barceló and S. Pérez-Esteva and it is still in progress.

[1] R. Alabern, J. Mateu, J. Verdera, \emph{A new characterization of Sobolev spaces on $\mathbb{R}^n$}, Math. Ann. , 2012, {\bf 354}(2): 589-–626.

[2] P. Hartman and C. Wilcox, \emph{Reproducing kernel for the Herglotz functions in and solutions of the Helmholtz equation}, Math. Zeitschr., 1961, {\bf 75}, 228--255.

[3] S. Pérez-Esteva and S. Valenzuela-Díaz, \emph{Reproducing kernel for the Herglotz functions in $\mathbb{R}^n$ and solutions of the Helmholtz equation}, J. Fourier Anal. Appl., 2017, {\bf 23}(4): 834--862.