basque center for applied mathematics

Working Seminar
(APDE-Analysis of Partial Differential Equations
Harmonic Analysis)

November 2, 2017, 12:30-14:00

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A CHARACTERIZATION OF BMO IN TERMS OF ENDPOINT BOUNDS FOR COMMUTATORS OF SINGULAR INTEGRALS

Given b a locally integrable real function and T a singular integral operator, we can define the commutator operator $[b,T]$ as $[b,T]f = bT(f) - T(bf)$. Coifman, Rochberg and Weiss proved that the commutator is a bounded operator in $L^p(\mathbb{R}^n)$ $(1 < p < \infty)$ when b belongs to the space BMO. They also got a converse result: if all the commutators of the Riesz transforms $[b, R_j]$, $1 \leq j \leq n$, are bounded in $L^p(\mathbb{R}^n)$ then $b \in$ BMO.

The case $p = 1$ was studied by Pérez. He showed that commutators with BMO functions and Calderón Zygmund operators are not necessarily weak $(1,1)$, but they satisfy a $L \log L$-type endpoint inequality. We will focus on proving the converse result: if we have that the commutator $[b,T]$ satisfy the $L \log L$ endpoint inequality, then the function $b \in$ BMO.

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EXCELENCIA SEVERO OCHOA

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