

**SINGULAR INTEGRALS WITH NON DOUBLING
MEASURES.**

MÀSTER DE MODELITZACIÓ MATEMÀTICA.

CURS 2011-2012.

1. The basic results (for measures with polynomial growth).

- Motivation: the Cauchy transform and the Painlevé problem. The linear growth assumption.
- Examples of non doubling measures.
- Covering theorems and maximal operators.
- Doubling cubes and balls.
- Calderón-Zygmund decomposition.
- Weak $(1, 1)$ and L^p boundedness of Calderón-Zygmund operators.
- Cotlar's inequality.

2. The Cauchy transform and curvature.

- The Cauchy kernel and Menger curvature.
- The Cauchy transform on Lipschitz graphs.
- The $T1$ theorem for the Cauchy transform.
- BMO .

BIBLIOGRAPHY.

- Javier Duoandikoetxea, *Fourier Analysis*, Graduate Text in Mathematics, vol 29, American Mathematical Society.
- Loukas Grafakos. *Classical and modern Fourier analysis*. Pearson, Prentice-Hall.
- Pertti Mattila, *Geometry of sets and measures in Euclidean spaces*. Cambridge University Press.
- Xavier Tolsa, *Analytic capacity and Calderón-Zygmund theory with non doubling measures*. In preparation.