Title: A gentle introduction to Rubio de Francia extrapolation

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Abstract: The Rubio de Francia theory of extrapolation is a powerful tool from harmonic analysis that has multiple important applications. The basic idea is simple: if an operator $T$ is bounded on a family of weighted $L^2$ spaces:

$$
\int_{\mathbb{R}^n} |Tf(x)|^2 w(x) \, dx \leq C \int_{\mathbb{R}^n} |f(x)|^2 w(x) \, dx,
$$

then $T$ is bounded on every $L^p$ space, $1 < p < \infty$:

$$
\int_{\mathbb{R}^n} |Tf(x)|^p \, dx \leq C \int_{\mathbb{R}^n} |f(x)|^p \, dx.
$$

In fact, much stronger conclusions hold: $T$ is bounded on a large family of weighted $L^p$ spaces, and is bounded on any Banach function space that satisfies some natural conditions.

In this talk we will give a more or less complete proof of a basic version of the extrapolation theorem, and then, as time permits, talk about various generalizations and extrapolations.