

April 3rd and 4th, 16:00-18:00

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MINI-COURSE: DISCRETE MARTINGALES AND APPLICATIONS TO ANALYSIS

The use of probabilistic techniques in Analysis has experienced a remarkable success in the last thirty years. In particular, discrete martingales have shown to be an illuminating tool in different areas such as boundary behavior of harmonic functions or other PDE's, Harmonic Analysis, Geometric Measure Theory and differentiation of real functions, among others.

In the course we will provide an introduction to the theory of dyadic martingales and some of their applications. A brief list of topics to cover might include:

1. Definitions and basic properties.
2. Stopping times.
3. The quadratic function.
 - H_p - type results.
 - Limit Theorems.
 - Good- λ inequalities and the Law of the Iterated Logarithm.
4. Applications.
 - Differentiation of real functions.
 - Fine properties of measures.