

INTRODUCTION TO ANALYSIS ON METRIC SPACES

This series of talks aims to give an introduction to first order analysis in the setting of metric measure spaces, and much of the discussion will be based on the approach of upper gradients. This approach, pioneered by Juha Heinonen and Pekka Koskela, is one of the many approaches that are available in the metric setting today, and is based on the fundamental theorem of calculus. Time permitting, we will also discuss applications in quasiconformal theory.

Talk I: Sobolev spaces and the fundamental theorem of calculus in Euclidean domains.

Talk II: Extension to metric measure spaces: upper gradients, Hajász gradients, weak slope, Cheeger energy.

Talk III: Doubling measure and p -Poincaré inequality: analytic and geometric consequences.

Talk IV: Potential theory under bounded geometry, and sets of finite perimeter.