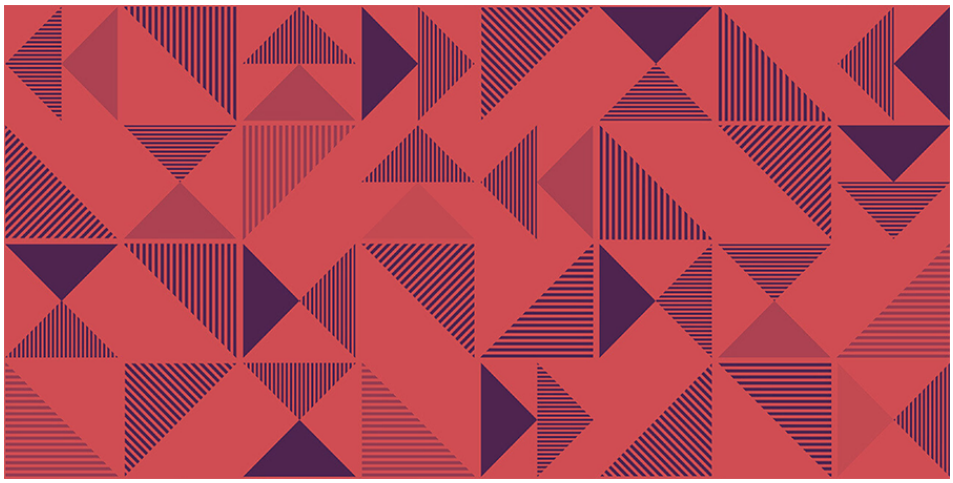
Geometric Measure Theory and related topics - FIRST WEEK



Report of Contributions

Contribution ID: **6** Type: **not specified**

On the de Rham complex in Carnot groups

Carnot groups are a class of nilpotent Lie groups naturally equipped with a horizontal distribution. When endowed with a compatible metric, they form subRiemannian manifolds, which are central objects in non-holonomic systems and control theory.
To better capture the algebraic and geometric structure of such spaces, Rumin introduced a refinement of the de Rham complex, now known as the Rumin complex. This subcomplex reflects key features of the underlying Lie algebra and proves to be more intrinsic to the subRiemannian context than the classical de Rham complex.
In this mini-course, we will introduce Carnot groups, explore their fundamental properties, and examine how the de Rham complex behaves in this setting. We will then construct the Rumin complex and carry out explicit computations in key examples, illustrating its relevance and effectiveness in subRiemannian geometry.

Presenter: TRIPALDI, Francesca (University of Leeds)

Contribution ID: **7** Type: **not specified**

Quantitative differentiability and rectifiability

Presenter: YOUNG, Robert (New York University)

Contribution ID: **8** Type: **not specified**

Regularity for area minimizing integral currents

We will explore the state of the art in interior and boundary regularity for solutions of the oriented Plateau problem, specifically in the framework of integral currents. After reviewing recent developments in interior regularity, we will shift our focus to the boundary setting. In this context, we will discuss the types of boundary points that naturally arise in the theory and introduce highly singular behaviors. We will then present some of the latest results on boundary regularity and highlight open problems that remain unsolved. Following this, we will outline the key ideas behind the proof of a Hausdorff dimension estimate for the boundary singular set, particularly in the linearized setting for multi-valued Dirichlet minimizers. This talk is based on joint work with Ian Fleschler and, separately, with Stefano Nardulli.

Presenter: RESENDE, Reinaldo (Carnegie Mellon University)

Contribution ID: **9** Type: **not specified**

A user's guide to distributional fractional spaces

We provide an introduction to the distributional theory of fractional spaces. In the first part of the talk, we define the Riesz fractional gradient, explore its key properties, and introduce the distributional fractional Sobolev and BV spaces along with their main features. In the second part, we discuss the properties of fractional variation and survey recent developments, including the fractional analog of De Giorgi's Blow-up Theorem.

Presenter: STEFANI, Giorgio (Università di Padova)