Second Meeting of the UK Metric Geometry and Analysis Network

Report of Contributions

Contribution ID: **10** Type: **not specified**

Welcome

Friday, 30 August 2024 09:00 (15 minutes)

Contribution ID: **11** Type: **not specified**

Pleijel Nodal domain theorem for the Robin problem on Lipschitz domains

Friday, 30 August 2024 14:15 (1 hour)

The classical Courant nodal domain theorem states that the number of nodal domains of the k-th Dirichlet eigenfunction is bounded above by k. Pleijel later showed that only a finite number of eigenfunctions realised this bound. There have been extensions and improvements of Pleijel's result to the Robin and Neumann boundary conditions requiring boundary regularity that is much stronger than being merely Lipschitz. De Ponti, Farinelli, and Violo recently proved Pleijel's nodal domain theorem for a class of metric measure spaces, which, in particular, applies the Pleijel theorem to the Neumann problem on a Lipschitz domain. We discuss how building upon their and previous results, we can obtain Pleijel's theorem for the Robin problem with any parameter on Lipschitz domains.
This is joint work with Katie Gittins, Corentin Léna, and David Sher.

Presenter: HASSANNEZHAD, Asma (Bristol)

Contribution ID: **12** Type: **not specified**

Reconstructing the topology of manifolds

Friday, 30 August 2024 10:30 (1 hour)

Given finitely many samples on a manifold, can we infer its topological invariants? We discuss some state of the art methods and theoretical bounds for inferring the homology of a manifold from a sufficiently dense point sample. In particular, we describe how these methods are motivated by dynamical systems and Morse theory. Conversely, we also show how these methods can help infer topological invariants associated to gradient dynamics from finite data.

Presenter: YIM, Ambrose (Cardiff)

Contribution ID: **13** Type: **not specified**

Community Updates

Friday, 30 August 2024 11:30 (15 minutes)

Contribution ID: **14** Type: **not specified**

Failure of the curvature-dimension condition in sub-Finsler manifolds

Friday, 30 August 2024 11:45 (1 hour)

The Lott–Sturm–Villani curvature-dimension condition CD(K,N) provides a synthetic notion for a metric measure space to have curvature bounded from below by K and dimension bounded from above by N. It has been recently proved that this condition does not hold in any sub-Riemannian manifold equipped with a positive smooth measure, for every choice of the parameters K and N. In this talk, we investigate the validity of the analogous result for sub-Finsler manifolds, providing two results in this direction. On the one hand, we show that the CD condition fails in sub-Finsler manifolds equipped with a smooth strongly convex norm and with a positive smooth measure. On the other hand, we prove that, for the sub-Finsler Heisenberg group, the same result holds for every reference norm. Additionally, we show that the validity of the measure contraction property MCP(K,N) on the sub-Finsler Heisenberg group depends on the regularity of the reference norm.

Presenter: MAGNABOSCO, Mattia (Oxford)

Contribution ID: **15** Type: **not specified**

Bi-Lipschitz embeddings of measures with partial transportation distances

Friday, 30 August 2024 09:15 (1 hour)

The question of bi-Lipschitz embeddability of Wasserstein spaces into classical Banach spaces has attracted much attention. The importance of such embeddings can be seen, for instance, in the proof of Almgren's partial regularity theorem.

In optimal transport, Wasserstein distances are the prime examples transportation metrics to compare measures of the same total mass. This talk will consider the partial transportation metric defined by Figalli and Gigli, which removes this mass constraint. We will begin with the definition of these spaces and discuss new relationships with other transportation metrics. We will then present new results regarding their bi-Lipschitz embeddability into Hilbert space. This is joint work with D. Bate.

Presenter: GARCÍA PULIDO, Ana Lucía (Stirling)