

Splitting maps in Type I Ricci flows

Panagiotis Gianniotis
Department of Mathematics
National and Kapodistrian University of Athens, Greece
pgianniotis@math.uoa.gr

Harmonic almost splitting maps are an indispensable tool in the study of the singularity structure of non-collapsed Ricci limit spaces. In fact, by recent work of Cheeger-Jiang-Naber [1] the singular stratification is rectifiable, and almost splitting maps can be used to construct bi-Lipschitz charts of the singular strata. For this, it is crucial to understand how a splitting map may degenerate at small scales, and when it doesn't.

In this talk we will discuss similar issues for a parabolic analogue of almost splitting maps, in the context of the Ricci Flow, and present some new results in [2] regarding the existence and small scale behaviour of almost splitting maps in a Ricci flow with Type I curvature bounds. It turns out that, as in the case of harmonic almost splitting maps, an almost splitting map at a given scale remains an almost splitting map even at smaller scales, modulo linear transformations, provided that the flow remains sufficiently selfsimilar. Moreover, we will see that the possible degeneration of these linear transformations is controlled in a certain way by a pointed version of Perelman's \mathcal{W} -entropy. We will also discuss how this relates to a conjecture of Perelman on the boundedness of the diameter of a 3d Ricci flow developing a finite time singularity, as we approach the singular time.

Acknowledgements

Supported by the Hellenic Foundation for Research and Innovation (H.F.R.I.) under the "2nd Call for H.F.R.I. Research Projects to support Faculty Members Researchers" (Project Number: HFRI-FM20-2958).

References

- [1] J. Cheeger, W. Jiang and A. Naber, *Rectifiability of singular sets of noncollapsed limit spaces with Ricci curvature bounded below*, Ann. of Math. (2) **193** (2021), no. 2, 407–538.
- [2] P. Gianniotis, *Splitting maps in Type I Ricci flows*, arXiv:2403.20070.