

# Iterative filtering for signals on the sphere: problems related to data analysis in non-Euclidean spaces.

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Since real-life data are non-stationary, it would be better to study them through non-stationary techniques, and 'Fast Iterative Filtering' has proven to be an interesting and useful method to achieve this goal, especially in classic 1D or 2D cases [3]. But some problems arise in non-Euclidean settings since the filtering relies on convolution.

After developing a continuous operator we analysed its discretisation through the Generalised Locally Toeplitz (GLT) sequences of matrices [2]. Using some property from the GLT theory we studied the convergence of this procedure [1].

In this talk, after a brief review on the topic, we will describe some problems related to this setting and what we have obtained so far to overcome them. We conclude our talk with a few examples of applications of this method to real life signals.

## References

- [1] G. Barbarino, A. Cicone, *Conjectures on spectral properties of ALIF algorithm*. Linear Algebra and its Applications, Volume 647, Pages 127-152, 2022.
- [2] C. Garoni, S. Serra-Capizzano. *Generalized Locally Toeplitz Sequences: Theory and Applications*. 2017
- [3] A. Cicone, H. Zhou *Multidimensional Iterative Filtering method for the decomposition of high-dimensional non-stationary signals*. Cambridge Core in Numerical Mathematics: Theory, Methods and Applications, Volume 10, Issue 2, Pages 278-298, 2017.