Non-uniform sampling over spiraling curves

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In this work we characterize the spectra of sampling sets contained in planar spiral-like curves. More precisely, when Λ is a subset of a set of the form $\{(r(\theta)\cos(2\pi\theta), r(\theta)\sin(2\pi\theta)) : \theta \geq 0\}$, then under some assumptions on the modulus $r(\theta)$ we give a complete characterization of the possible closed convex central-symmetric spectra for which Λ is a sampling set in terms of a critical value of the gap $\rho(\Lambda) := 2\sup_{x\in R^2} d(x, \Lambda)$. We also provide some particular examples of this type of curves.

The main tools come from Beurling's work in the balayage of Fourier transforms [1, 2].

Joint work with: Philippe Jaming (Université de Bordeaux), José Luis Romero (Österreichischen Akademie der Wissenschaften).

References

[1] A. Beurling, *Local harmonic analysis with some applications to differential operators.* Some Recent Advances in the Basic Sciences, Volume 1 (1963–1964), Annual science conference proceedings, Belfer Graduate School of Science, Yeshiva University, New York, 109–125. Reprinted in: The collected Works of Arne Beurling, Volume 2, (1989), Birkhauser, Boston.

[2] A. Beurling, *Balayage of Fourier-Stieljes Transforms.* The collected works of Arne Beurling, Volume 2, (1989), Birkhuser, Boston.

[3] J.J. Benedetto & H.C. Wu, *Non-uniform sampling and spiral MRI reconstruction.* Proceedings of SPIE, **4119**, (2000), 130–141.