

Gabor frames coming from difference sets

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Abstract

We consider discrete lines in projective geometry, and investigate constructions coming from combinatorial design theory, called difference sets.

It is known [1] that the set of all modulations of a characteristic function of difference set form an equiangular tight frame for the subspace they span. On the other hand, we know that the full collection of time-frequency shifts of a given nonzero N dimensional vector is a tight frame for the whole space [2].

Therefore, the question that we are asking is, what kind of properties has the full Gabor system generated by a difference set?

In this talk, we will see the structure of the Gram matrix of those systems, their coherence properties, and state some open questions. This is joint work with V. Paternostro.

References

- [1] P. Xia, S. Zhou, G. B. Giannakis. Achieving the Welch Bound With Difference Sets. *IEEE Transactions on Information Theory*, Vol.51, No.5, May 2005.
- [2] W. U. Bajwa, R. Calderbank, S. Jafarpour. Why Gabor Frames? Two Fundamental Measures of Coherence and Their Role in Model Selection. *J. Commun. Netw.*, 12: 289-307, 2010.