

A WEIGHTED WELCH INEQUALITY

LAURA MANOLESCU

Abstract. In this paper, we give a generalization of the Welch inequality, a weighted version in the presence of a normal matrix as a weight. Also, we obtain connections with tight frames and we give some examples.

Mathematics subject classification (2020): 15Axx, 42C15.

Keywords and phrases: Welch inequality, frames.

REFERENCES

- [1] J. J. BENEDETTO, M. FICKUS, *Finite normalized tight frames*, Advances in Computational Mathematics, **18** (2003), 357–385.
- [2] O. CHRISTENSEN, *An Introduction to Frames and Riesz Bases*, Birkhäuser, 2003.
- [3] I. DAUBECHIES, A. GROSSMANN AND Y. MEYER, *Painless nonorthogonal expansions*, J. Math. Phys., **27**, (1986), 1271–1283.
- [4] S. DATTA, S. D. HOWARD, D. COCHRAN, *Geometry of the Welch bounds*, Linear Algebra and its Applications, **437**, (2012), 2455–2470.
- [5] M. A. DAVENPORT, M. F. DUARTE, Y. C. ELДАР AND G. KUTYNIOK, *Introduction to Compressed Sensing*, in: Compressed Sensing: Theory and Applications (Y. C. Eldar and G. Kutyniok, eds.), Cambridge University Press, 2012.
- [6] R. J. DUFFIN, A. C. SCHAEFFER, *A class of nonharmonic Fourier series*, Trans. Amer. Math. Soc. **72**, (1952), 341–366.
- [7] P. GĂVRUȚA, *Some properties of frames in Hilbert spaces*, Bul. Șt. Univ. Politehnica Timișoara, ser. Mat.-Fiz., Tom. **48** (62) 2, (2003), 73–80.
- [8] D. HAN, K. KORNELSON, D. LARSON, E. WEBER, *Frames for undergraduates*, American Mathematical Society, vol. 40, Providence, Rhode Island, 2007.
- [9] J. JASPER, D. G. MIXON AND M. FICKUS, *Kirkman equiangular tight frames and codes*, IEEE Trans. Inform. Theory **60**, (2014), 170–181.
- [10] J. L. MASSEY AND T. MITTELHOLZER, *Welch’s bound and sequence sets for code-division multiple-access systems*, Sequences II (R. Copocelli, A. De Santis and U. Vaccaro, eds.), Springer-Verlag, New York, 1993, 63–78.
- [11] J. M. RENES, R. BLUME-KOHOUT, A. J. SCOTT AND C. M. CAVES, *Symmetric informationally complete quantum measurements*, J. Math. Physics, **45** (6) (2004), 2171–2180.
- [12] A. J. SCOTT, *Tight informationally complete quantum measurements*, J. Phys. A., **39**, (2006), 13507–13530.
- [13] S. WALDRON, *Generalized Welch bound equality sequences are tight frames*, IEEE Trans. Inform. Theory **49** (9) (2003), 2307–2309.
- [14] L. R. WELCH, *Lower bounds on the maximum cross correlation of signals*, IEEE Trans. Inform. Theory, vol. IT-20, (1974), 397–399.