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Matthew Fickus* (matthew.fickus@afit.edu), Department of Mathematics and Statistics, Air Force Institute of Technology, Wright-Patterson AFB, OH 45433. *Some new results regarding equiangular tight frames.*

An equiangular tight frame (ETF) is a sequence of unit vectors in Euclidean space such that (i) the absolute value of any two of these vectors is some fixed constant and (ii) their corresponding rank-one orthogonal projection operators sum to a scalar multiple of the identity. In the real-variable setting, ETFs yield optimal packings of lines, that is, sets of lines whose minimum pairwise angle is as large as possible. More generally, ETFs are sequences of unit norm vectors with minimal coherence, a property that makes them valuable in communications and compressed sensing applications. Only a few general constructions of ETFs are known, and all of these rely on topics of combinatorial design such as strongly regular graphs, difference sets, balanced incomplete block designs and conference matrices. We present a few new results concerning ETFs, including some new necessary conditions on the existence of certain classes of ETFs, as well as some new approaches for constructing them. (Received July 21, 2014)