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Matthew Fickus* (matthew.fickus@afit.edu). *Equiangular tight frames from group divisible designs.*

Given positive integers $N \geq D$, an equiangular tight frame $\text{ETF}(D, N)$ is a type of optimal packing of N lines in a real or complex Hilbert space of dimension D . In the complex setting, the existence of an $\text{ETF}(D, N)$ remains unresolved for many choices of D and N . In this talk, we observe that the (D, N) parameters of many of the known constructions of ETFs are of one of two types. We further provide a new method for combining a given ETF of one of these two types with an appropriate group divisible design (GDD) in order to produce a larger ETF of the same type. By applying this method to known families of ETFs and GDDs, we obtain several new infinite families of ETFs. Our approach was inspired by a seminal paper of Davis and Jedwab which both unified and generalized McFarland and Spence difference sets. We provide combinatorial analogs of their algebraic results, unifying Steiner ETFs with hyperoval ETFs and Tremain ETFs. (Received January 16, 2018)