

Recent progress on equiangular lines

Wei-Hsuan Yu

April 8, 2019

A set of lines through the origin in Euclidean space is called equiangular when any pair of lines from the set intersects with each other at a common angle. We study the maximum size of equiangular lines in Euclidean space and use a graph theoretic approach to prove that all the currently known constructions for maximum equiangular lines in \mathbb{R}^d cannot be enlarged by any other line to form a larger equiangular set of lines when $d = 14, 16, 17, 18, 19,$ and 20 . We give new constructions of large equiangular lines which are 248 equiangular lines in \mathbb{R}^{42} , 200 equiangular lines in \mathbb{R}^{41} , 168 equiangular lines in \mathbb{R}^{40} , 152 equiangular lines in \mathbb{R}^{39} with angle $1/7$, and 56 equiangular lines in \mathbb{R}^{18} with angle $1/5$. This talk is based on joint work with Yen-Chi Lin.