## Dual relationship of regular graphs and spherical codes

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## Abstract

We will introduce some dual relationship between regular graphs and spherical codes. In this relationship, the distinct eigenvalues of a regular graph dually correspond to inner products of a spherical code. The spectral gap of a regular graph is the difference of the largest and second-largest eigenvalues. The spectral gap dually corresponds to the minimum distance of a spherical code. It is known that a graph with large spectral gap has high connectivity in some sense. We would like to find graphs with largest spectral gap for given degree and order, or largest graphs for given degree and second-largest eigenvalue. In this talk, we introduce several new results about the two problems.

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