Title: Distance Matrix of a Class of Completely Positive Graphs: Determinant and Inverse

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Abstract

A real symmetric matrix A is said to be completely positive if it can be written as BB^t for some (not necessarily square) nonnegative matrix B. A simple graph G is called a completely positive graph if every matrix realisation of G that is both nonnegative and positive semidefinite is a completely positive matrix. Our aim in this manuscript is to compute the determinant and inverse (when it exists) of the distance matrix of a class of completely positive graphs. We compute a matrix R such that the inverse of the distance matrix of a class of completely positive graphs is expressed a linear combination of the Laplacian matrix, a rank one matrix of all ones and R. This expression is similar to the existing result for trees. We also bring out interesting spectral properties of some of the principal submatrices of R.

Overview of the talk

I will introduce basic notions in Graph Theory and Matrices, then move on to Completely Positive Matrices and CP Graphs. Next, I will describe the results which have been proved in the direction of Distance Matrices (related to our work) and then what we want to contribute/proof in this direction. I will mainly state the results but skip the proofs since they are mostly algorithm-based and computational.