# Positive extensions of matrices indexed by a homogeneous tree

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Let $T$ be a homogeneous tree of order $q$ – that is, an acyclic, undirected, connected graph such that every node belongs to exactly $q+1$ edges. Let $T_n$ be a maximal subgraph of $T$ with the property that the distance between any two nodes of $T_n$ does not exceed $n$, and let $A = [a_{t,s}]_{t,s \in T_n}$ be a square positive definite matrix indexed by the nodes of $T_n$. The matrix $A$ is said to be *isotropic* if $a_{t,s}$ depends only on the distance between the nodes $t$ and $s$ (in the case $q = 1$ this means that $A$ is a real symmetric Toeplitz matrix). The positive extension problem for the matrix $A$ consists in finding all such isotropic positive definite matrices $B$ indexed by the nodes of $T_{n+1} \supset T_n$ that the diagonal block of $B$ corresponding to $T_n$ coincides with $A$.

In this talk we shall discuss a solution of the positive extension problem based on the canonical form of isotropic matrices, obtained in a joint work with D. Alpay.