UNIONS OF A CLIQUE AND A CO-CLIQUE AS STAR COMPLEMENTS 
FOR NON-MAIN GRAPH EIGENVALUES

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Abstract. Graphs consisting of a clique and a co-clique, both of arbitrary size, are considered in the role of star complements 
for an arbitrary non-main eigenvalue. Among other results, the sign of such a eigenvalue is discussed, the neighbourhoods of 
star set vertices are described, and the parameters of all strongly regular extensions are determined. It is also proved that, 
apart from a specified special case, if the size of a co-clique is fixed then there is a finite number of possibilities for our star 
complement and the corresponding non-main eigenvalue. Numerical data on these possibilities is presented.

Key words. Adjacency matrix, Non-main part of the spectrum, Graph extension, Strongly regular graph, Block design.

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