



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

ZORAN STANIĆ[†]

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.

AMS subject classifications. 05C50, 65F15.

*Received by the editors on July 14, 2017. Accepted for publication on March 4, 2019. Handling Editor: Bryan L. Shader.
[†]Faculty of Mathematics, University of Belgrade, Belgrade, Serbia (zstanic@math.rs). Supported by Serbian Ministry of Education, Science and Technological Development, projects no. 174012 and no. 174033.