

A FURTHER LOOK INTO COMBINATORIAL ORTHOGONALITY*

SIMONE SEVERINI[†] AND FERENC SZÖLLŐSI[‡]

Abstract. Strongly quadrangular matrices have been introduced in the study of the combinatorial properties of unitary matrices. It is known that if a $(0,1)$ -matrix supports a unitary then it is strongly quadrangular. However, the converse is not necessarily true. In this paper, strongly quadrangular matrices up to degree 5 are fully classified. It is proven that the smallest strongly quadrangular matrices which do not support unitaries have exactly degree 5. Further, two submatrices not allowing a $(0,1)$ -matrix to support unitaries are isolated.

Key words. Strong quadrangularity, Combinatorial matrix theory, Combinatorial orthogonality, Orthogonal matrices.

AMS subject classifications. 05B20.

*Received by the editors October 29, 2007. Accepted for publication July 17, 2008. Handling Editor: Miroslav Fiedler.

[†]Institute for Quantum Computing and Department of Combinatorics and Optimization, University of Waterloo, N2L 3G1 Waterloo, Canada (simoseve@gmail.com).

[‡]Budapest University of Technology and Economics (BUTE), Institute of Mathematics, Department of Analysis, Egy J. u. 1, H-1111 Budapest, Hungary (szoferi@math.bme.hu).