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Trivial Nomura algebra

First introduced by Sylvester in 1867 as inverse orthogonal matrices, a type II matrix is an invertible $n \times n$ matrix that has no zero entry, whose inverse can be easily obtained by inverting every entry, taking the transpose and multiplying by n^{-1} . Hadamard matrices and spin models are well known examples of type II matrices.

Nomura gave a construction of a formally dual pair of association schemes from each type II matrix. Despite the potential of finding new dual pairs of association schemes from Nomura's construction, almost all of the type II matrices we have examined yield the trivial association schemes. In this talk, we discuss what we can say in this disappointing situation.