

Paley Constructions of Hadamard Matrixes

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Abstract

This document presents examples of constructing Hadamard matrixes using two methods attributed to Raymond Paley. In particular the illustrations include quadratic residue calculations from a Galois field for both the p^1 and p^k cases, polynomial division with remainder, and construction of the prerequisite Jacobsthal matrix for both cases.

The construction methods are implemented in Java at <https://github.com/wannamak/hadamard/>.

1 Choosing a construction

Table 1: Paley Constructions

Hadamard order	p^k	Paley type
4	3	I
8	7	I
12	11	I
16		
20	19	I
24	23	I
28	13	II
32	31	I
36	17	II
40		44 43 I