

Quaternary Golay sequences of length 2^m

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Abstract

A Golay pair, or pair of complementary sequences, is a pair of sequences with the property that their out-of-phase autocorrelations sum up to zero. Complementary binary sequences were introduced by Marcel Golay to study problems in infrared multislit spectrometry. Both binary and polyphase Golay sequences have since found many applications, such as in optical time-domain reflectometry or orthogonal frequency-division multiplexing.

In 1999, Davis and Jedwab published a connection between Golay complementary sequences and second-order Reed-Muller codes over alphabets Z_{2^h} . In 2005, Li and Chu published a list of quaternary Golay sequences of length 16 that did not seem to fit into the framework provided by Davis and Jedwab. We will explain the origin of these sequences and discuss the impact they have on the general theory of Golay sequences.

This is joint work with Jonathan Jedwab and Matthew Parker.