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Non-Existence of Golay Sequence Pairs and Vanishing Sums of Roots of Unity

The only known non-existence results for Golay sequence pairs are due to Golay and Eliahou et.al. Golay showed that there are no binary Golay sequences of odd length. Eliahou et.al. proved that if n is the length of a binary Golay sequence pair then n has no prime factor congruent 3 modulo 4.

We present non-existence results for H -phase Golay sequence pairs when $H/2$ is odd.