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On the Nonexistence of Generalized Bent Functions

An (m, n) -generalized bent function is a function from \mathbb{Z}_2^n to \mathbb{Z}_m so that its associated Fourier transformations have constant absolute value. It is known that an (m, n) -generalized bent function exists whenever one of the following holds:

(1) both m and n are even.

(2) $4 \mid m$.

On the other hand, all known results suggest that for (m, n) pair that fails to satisfy both of the above conditions, (m, n) -generalized bent function does not exist. In this talk, we will discuss the recent nonexistence result of $(m, 4)$ -generalized bent functions with m being odd. This result crucially relies on analyzing vanishing sums of complex roots of unity.

This is joint work with Ka Hin Leung (National University of Singapore) and Songtao Mao (Johns Hopkins University).