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Pairs of Maximal Length Sequences with Few Cross-Correlations

We consider pairs of binary maximal length sequences, with one a decimation of the other, and examine the cross-correlations between the one and all the cyclic shifts of the other. We use arithmetic and combinatorial techniques to determine constraints on the number of distinct cross-correlation values that appear and their 2-adic distances from -1 as a function of the length of the sequences and the decimation.