

Abstract

For odd $n = 2^l + 1$ and an integer $\rho, 1 \leq \rho \leq l$, a new family $\mathcal{S}_o(\rho)$ of binary sequences with period $2^n - 1$ is constructed. For a given ρ , $\mathcal{S}_o(\rho)$ has maximum correlation $1 + 2^{\frac{n+2\rho-1}{2}}$, family size $2^{n\rho}$, and maximum linear span $\frac{n(n+1)}{2}$. Similarly, a new family of $\mathcal{S}_e(\rho)$ of binary sequences with period $2^n - 1$ is also presented for even $n = 2^l$ and an integer $\rho, 1 \leq \rho < l$, where maximum correlation, family size, and maximum linear span are $1 + 2^{\frac{n}{2}+\rho}$, $2^{n\rho}$, $\frac{n(n+1)}{2}$, respectively. The new family $\mathcal{S}_o(\rho)$ (or $\mathcal{S}_e(\rho)$) contains Boztas and Kumar's construction [1] (or Udaya's [2]) as a subset if m -sequences are excluded from both constructions. As a good candidate with both low correlation and large family size, the family $\mathcal{S}_o(2)$ is discussed in detail by analyzing its distribution of correlation values.