Abstract

Let $\mathbb{F}_{2^m}$ be a finite field of cardinality 2^m, λ and k be integers satisfying $\lambda, k \geq 2$ and denote $R = \mathbb{F}_{2^m}[u]/\langle u^{2\lambda}\rangle$. Let $\delta, \alpha \in \mathbb{F}_{2^m}^{\times}$. For any odd positive integer n, we give an explicit representation and enumeration for all distinct $(\delta + \alpha u^2)$-constacyclic codes over R of length $2^k n$, and provide a clear formula to count the number of all these codes. As a corollary, we conclude that every $(\delta + \alpha u^2)$-constacyclic code over R of length $2^k n$ is an ideal generated by at most 2 polynomials in the residue class ring $R[x]/\langle x^{2^k n} - (\delta + \alpha u^2)\rangle$.