A class of skew cyclic codes
and
applications in constructing quantum codes

Hai Dinh

Department of Mathematical Sciences, Kent State University, USA.

Let p be any odd prime, and k be an integer such that $k \mid p-1$. This talk discusses quantum codes from skew cyclic codes over the ring $R = \frac{\mathbb{F}_q[u]}{\langle u^{k+1}-u \rangle}$, where q is a power of p. We construct a set orthogonal idempotents of this ring R, and using that skew cyclic codes over the ring R are decomposed as direct sum of skew cyclic codes over $\mathbb{F}_q$. We obtain a necessary and sufficient condition for a skew cyclic code to contain its dual. As an application, we construct quantum codes from skew cyclic codes over $\mathbb{F}_q$. It is observed that some quantum codes we obtained are MDS quantum codes, i.e., they are optimal with respect to the quantum Singleton bound. We will also discuss on possible generalizations and applications of this approach.