

## Abstract

Combinatorial designs are closely related to linear codes. Recently, some near MDS codes were employed to construct  $t$ -designs by Ding and Tang, which settles the question regarding whether there exists an infinite family of near MDS codes holding an infinite family of  $t$ -designs for  $t \geq 2$ . In this talk, I will introduce some constructions of infinite families of 3-designs and 2-designs from special equations over finite fields. First, I will present an infinite family of almost MDS codes over  $GF(p^m)$  holding an infinite family of 3-designs. Then I will provide an infinite family of almost MDS codes over  $GF(p^m)$  holding an infinite family of 2-designs for any field  $GF(q)$ . In particular, some of these almost MDS codes are near MDS. Second, I will present an infinite family of near MDS codes over  $GF(2^m)$  holding an infinite family of 3-designs by considering the number of roots of a special linearized polynomial. Compared to previous constructions of 3-designs or 2-designs from linear codes, the parameters of some of our designs are new and flexible. This is a joint work with Guangkui Xu and Longjiang Qu.