

1035-05-1463

Cunsheng Ding and **Zeying Wang*** (wangz@math.udel.edu), Department of Mathematical Sciences, Ewing 501, University of Delaware, Newark, DE 19716, and **Qing Xiang**. *Skew Hadamard Difference Sets from the Ree-Tits Slice Symplectic Spreads in $\text{PG}(3, 3^{2h+1})$* .

Using a class of permutation polynomials of $\mathbb{F}_{3^{2h+1}}$ obtained from the Ree-Tits slice symplectic spreads in $\text{PG}(3, 3^{2h+1})$, we construct a family of skew Hadamard difference sets in the additive group of $\mathbb{F}_{3^{2h+1}}$. With the help of a computer, we show that these skew Hadamard difference sets are new when $h = 2$ and $h = 3$. We conjecture that they are always new when $h > 3$. Furthermore, we present a variation of the classical construction of the twin prime power difference sets, and show that inequivalent skew Hadamard difference sets lead to inequivalent difference sets with twin prime power parameters. (Received September 19, 2007)