Remarks on the number of solutions to certain equations over finite fields. (Chinese. English summary) Zbl 07448870
Pure Appl. Math. 37, No. 2, 188-197 (2021)

Summary: Let $F_q$ be a finite field of $q$ elements, where $q = p^r$, $r \geq 1$, and $p$ is an odd prime number. We study the Markoff-Hurwitz-type equation in $F_q$, and provide a combinatorial proof to the formula for the number of solutions to the equation when the augmented degree matrix is invertible in the residue class ring $\mathbb{Z}/(q - 1)\mathbb{Z}$. We also consider its generalization, and obtain the formula for the number of solutions to the equation in $F_q$ under special conditions.

MSC:
11T06 Polynomials over finite fields
11D41 Higher degree equations; Fermat’s equation
11D45 Counting solutions of Diophantine equations

Keywords:
finite field; Markoff-Hurwitz-type equation; augmented degree matrix; Gauss sum

Full Text: DOI