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Permutation Polynomials And Their Applications

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In mathematics, a permutation polynomial (for a given ring) is a polynomial that acts as a permutation of the elements of the ring, i.e. the map $\{x \mapsto g(x)\}$ is a bijection. In case the ring is a finite field, the Dickson polynomials, which are closely related to the Chebyshev polynomials, provide examples.

Permutation polynomial - Wikipedia

A polynomial over a finite ring R is called permutation polynomial if it induces a bijection from R to R . Permutation polynomials have been a subject of study for many years and have applications in many areas of science and engineering. This monograph contains some results related to permutation polynomials over finite rings and finite fields.

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978-3-8484-0611-1, 9783848406111,
384840611X, Mathematics, A polynomial
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polynomial if it induces a bijection from
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and have applications in many areas of
science and engineering.

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Permutation polynomials over finite
rings have several applications in
combinatorics, coding theory and
cryptography. For example, the RC6
block cipher uses the permutation
polynomial $x + 2x^2$ over the finite ring
 \mathbb{Z}_2^n , where 2^n is the word size of
machine. In 2001, Rivest found an exact
characterization of permutation polynomial
over finite rings \mathbb{Z}_2^n .

PERMUTATION POLYNOMIALS AND THEIR APPLICATIONS IN CRYPTOGRAPHY

If $m = q - 1$, we get $Q = X^r P(X)$ is a

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permutation polynomial if and only if the associated function on F_q is injective. 60Y. Laigle-Chapuy/Finite Fields and Their Applications 13 (2007) 58–70. Remark 3. If $m = 1$, we get $Q = P(1)X$ is a permutation polynomial if and only if (i) $\text{Gcd}(r, q-1) = 1$. (ii) $P(1) = 0$.

Permutation polynomials and applications to coding theory

We discuss a special class of permutation polynomials over finite fields focusing on some recent work on their factorization. In particular we obtain permutation polynomials with various factorization patterns that are favoured for applications. We also address a wide range of problems of current interest concerning irreducible factors of the terms of sequences and iterations of such ...

Permutation polynomials and factorization | SpringerLink

Permutation polynomials over finite fields, which were first studied by

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Hermite [4] and Dickson [5], have wide applications in the areas of mathematics and engineering such as coding theory, cryptography and combinatorial designs (see [6], [7], [8], [9], [10], [11] for example).

Some new forms of permutation polynomials based on the AGW ...

Permutation polynomials of the form $x\tau f(x^3)$ over a finite field give rise to group permutation polynomials. We give a group theoretic criterion and some other criteria in terms of symmetric functions and power functions. Share content Export citation Request permission

Permutation polynomials and group permutation polynomials ...

A polynomial can represent every function from a finite field to itself. The functions which are also permutations of the field give rise to permutation polynomials, which have potential applications in cryptology and coding theory. Permutation polynomials over

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finite rings are studied with respect to the sequences they generate.

Sequences of numbers via permutation polynomials over some

...

Permutation polynomials of finite fields without further considerations are not difficult to construct. (There are $q!$ PPs of F_q , all of which are given by the Lagrange interpolation.) In general, we are only interested in the PPs that either have a simple or nice algebraic appearance or possess additional extraordinary properties; such additional properties are usually required by applications of PPs in other areas of mathematics and engineering.

Permutation polynomials over finite fields — A survey of ...

Computers and Mathematics with Applications 38 (1999) 1-10
www.elsevier.nl/locate/camwa
Kronecker Polynomials and Their Applications P. RdZSA Technical

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Applications In Cryptography
University of Budapest, Institute of
Mathematics H-1521 Budapest, Hungary
rozsakath, brae. ... It is easy to show
that an appropriate permutation of the
rows and the corresponding

Kronecker Polynomials and Their Applications

If the map $x \mapsto F\phi(x)$ induces a
permutation on the underlying field we
say $F\phi$ is a permutation polynomial.
Permutation polynomials have
applications in many diverse fields of
mathematics. In this dissertation we are
generally concerned with the following
question: Given a polynomial f , when
does the map $x \mapsto F(x)$ induce a
permutation on \mathbb{F}_q .

"Some Results Concerning Permutation Polynomials over ...

Permutation polynomials are an
interesting subject of mathematics and
have applications in other areas of
mathematics and engineering.

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(PDF) Permutation polynomials from piecewise functions

These permutation polynomials, characterized by the property that both $f(x) \in \mathbb{F}_q[x]$ and its associated mapping $f(x)+x$ are permutations, have an important application in ...

(PDF) On the difference between permutation polynomials

For $n = 6$ we explicitly list all a 's for which $a x^d$ is a complete permutation polynomial (CPP) over \mathbb{F}_q . Some previous characterization results by Wu et al. for $n = 4$ are also made more explicit by providing a complete list of a 's such that $a x^d$ is a CPP. ... Muratovic-Ribic, E. Pasalic, A note on complete polynomials over finite fields and ...

On monomial complete permutation polynomials | Finite ...

constructing permutation polynomials over finite fields - volume 89 issue 3 - xiaoer qin, shaofang hong Skip to main content We use cookies to distinguish

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CONSTRUCTING PERMUTATION POLYNOMIALS OVER FINITE FIELDS

...

Permutation polynomials over finite fields have been an interesting subject of study for many years, and have applications in coding theory, cryptography [20,19], combinatorial design theory, and other areas of mathematics and engineering.

Finite Fields and Their Applications

A piecewise construction of permutation polynomials over finite fields. N Fernando, X Hou. Finite Fields and Their Applications 18 (6), 1184-1194, 2012.
26: 2012: A new approach to permutation polynomials over finite fields, II. N Fernando, X Hou, SD Lappano.

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Multivariate Public Key
Cryptography