$\mathrm{SU}(2;\mathbb{F}_{\mathbb{C}}(q^2)) \to \mathrm{SO}(3;\mathbb{F}_{\mathbb{R}}(q))$

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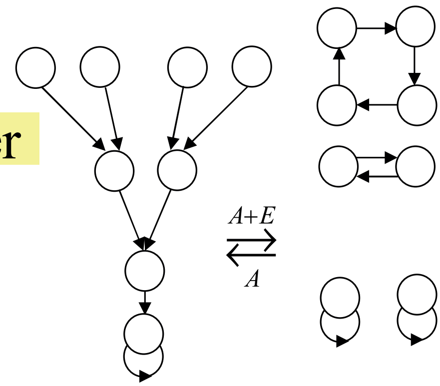
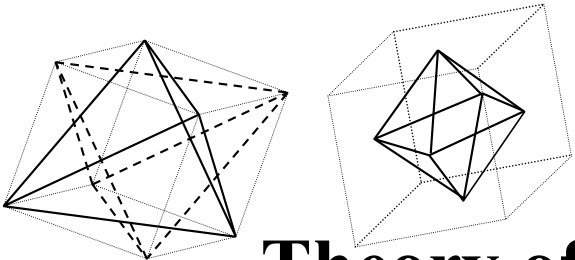
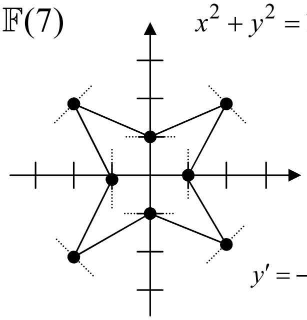




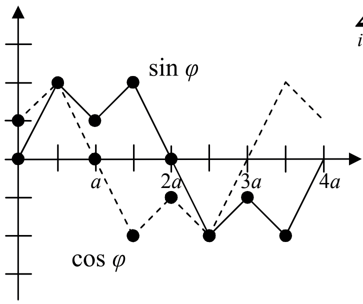
Theory of Finite Fields

$$\frac{q-1}{2}(N_{n,r^2\equiv R}+N_{n,r^2\equiv NR})+N_{n,r^2\equiv 0}=q^n$$

$\mathbb{F}(7)$ $\quad x^2+y^2=1$



$y' = -\frac{x}{y}$

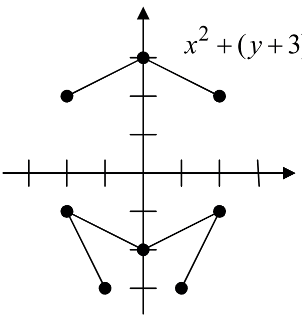


$$\sum_{i=0}^{\infty} x^i = \frac{1}{1-x},\ x \neq 1$$

$\mathrm{Ord}\ \mathrm{O}(n;\mathbb{F}(q))$

$$j^2 = -\alpha \equiv NR \in \mathbb{F}(q)$$

$x^2+(y+3)^2=1$



$$(a+b)^p = a^p + b^p$$

$$e^A = \varphi(A) = \begin{pmatrix} e^2 & e^2 & 0 \\ 0 & e^2 & 0 \\ 0 & 0 & e^4 \end{pmatrix} =: B$$

$E = mc^2$

SHAKER VERLAG

$\Box \underline{E} = 0$

$$\overline{211}:\ \mathcal{A}^{-1}\{F(a)\} = f(k) = 3 + 2\left[(2+2j)^k + (2-2j)^k\right]$$

Berichte aus der Mathematik

Wolf-Michael Wendler

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and a Comparison with Characteristic 0

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Shaker Verlag GmbH • Am Langen Graben 15a • 52353 Düren
Phone: 0049/2421/99011-0 • Telefax: 0049/2421/99011-9
Internet: www.shaker.de • e-mail: info@shaker.de

Abstract: Theory of Finite Fields

The book contains eight Chapters. The first Chapter is named as Elementary Number Theory and Algebra, where in the latter we introduce groups, rings, and fields as well as complex numbers over finite fields. Within the next Chapter on Algebraic Analysis, we give the definition of functions, both algebraic and transcendental, differential and integral calculus, and elements of complex functions. Chapter 3 treats usual topics of Linear Algebra, like vectors and matrices, the Jordan canonical form as well as the calculation of the matrix exponential function and its inverse. Euclidean geometry of circles, 3-balls, and n-balls with an excursion to pseudo-Euclidean geometry of circles as well as symplectic and differential geometry are treated in Chapter four. Several algebras, like Lie-, Grassmann-, Clifford-algebras are subject to Chapter 5, where we also include a Section on elementary graph theory. In the next Chapter the orders or classical matrix Lie-groups are derived, where as an aside we rediscover the octahedron group. Chapter 7 and 8 contain systems theory and the formulation of elementary physical theories as mechanics, electrodynamics, and quantum mechanics, respectively.