Contents

List of Tables

List of Symbols

Symbol	Description
p	Prime number
q	Prime power
$\mathbb{F}_q$	Finite field of order q
$\mathbb{F}_q^*$	Set of nonzero elements of $\mathbb{F}_q$
J	$\{1, 2, 3, 4, 5, 6\}$ (used in Chapter 2)
$\mathcal{S}$	$\mathbb{F}_q[\mathsf{u}, \mathsf{v}, \mathsf{w}]/\langle \mathsf{u}^3 - \mathsf{u}, \mathsf{v}^2 - \mathsf{v}, \mathsf{w}^2 - \mathsf{w}, \mathsf{uv}, \mathsf{vu}, \mathsf{uw}, \mathsf{wu}, \mathsf{vw} - \mathsf{wv}\rangle$
$\mathcal{R}$	$\mathbb{F}_q[u_1, u_2, \ldots, u_r]/\langle u_i^3 - u_i, u_i u_j - u_j u_i\rangle$
$\mathcal{T}$	$\mathbb{F}_q[u_1, u_2, \ldots, u_r]/\langle f_j(u_j), u_i u_j - u_j u_i\rangle$
$\mathcal{U}(R)$	Set of units (whose multiplicative inverse exist) in the ring R
C	Codes over $\mathbb{F}_q$ (except for the codes obtained by decomposition of codes over rings)
$\mathcal{C}$	Codes over rings
$\langle f(y)\rangle$	Ideal generated by $f(y)$
$f^*(y)$	Reciprocal polynomial of $f(y)$
$f^\dagger(y)$	Left monic skew reciprocal polynomial of $f(y)$
$\bar{f}^\dagger(y)$	Hermitian left monic skew reciprocal polynomial of $f(y)$
C	Code over $\mathbb{F}_q$
$\mathcal{C}$	Code over a ring
$a \mid b$	a divides b
$\equiv$	Congruent to
θ	An automorphism of $\mathbb{F}_q$
Θ	An automorphism of ring R, where $R = \mathcal{S}, \mathcal{R}, \mathcal{T}$
$[n, k, d]$	A classical linear code with length n, dimension k, and minimum distance d

Symbol	**Description**
$[[n, k, d]]$	A quantum code with length n, dimension k, and minimum distance d
$[[n, k, d; c]]$	An EAQECCs with length n, dimension k, and minimum distance d using c ebits

Abbreviations

Abbreviation	**Description**
AMDS	Almost Maximum Distance Separable
BKLC	Best Known Linear Code
CSS	Calderbank-Shor-Steane
EAQECC	Entanglement-Assisted Quantum Error-Correcting Code
GCRD	Greatest Common Right Divisor
LCD	Linear Complementary Dual
MDS	Maximum Distance Separable
QECC	Quantum Error-Correcting Code