Cheat Sheet GF(4)

January 16, 2021

polynomial: $X^2 + X + 1 = 7$
$Z_i = \log_\alpha(1 + \alpha^i)$

i	γ_i	$-\gamma_i$	γ_i^{-1}	$\log_\alpha(\gamma_i)$	α^i	Z_i	$\phi(\gamma_i)$	$T(\gamma_i)$	$N(\gamma_i)$
0	$0 = 0$	0	DNE	DNE	1	DNE	0	0	0
1	$1 = 1$	1	1	3	2	2	1	0	1
2	$\alpha = \omega$	2	3	1	3	1	3	1	1
3	$\alpha + 1 = \omega^2$	3	2	2	1	DNE	2	1	1

+	0	1	2	3
0	0	1	2	3
1	1	0	3	2
2	2	3	0	1
3	3	2	1	0

·	1	2	3
1	1	2	3
2	2	3	1
3	3	1	2

$2^0 = 1$ $\qquad$ $2^3 = 1$
$2^1 = 2$
$2^2 = 3$

i	γ_i	$-\gamma_i$	γ_i^{-1}	$\log_\alpha(\gamma_i)$	α^i	Z_i	$\phi(\gamma_i)$	$T(\gamma_i)$	$N(\gamma_i)$
0	$0 = 0$	0	DNE	DNE	1	DNE	0	0	0
1	$1 = 1$	1	1	3	2	2	1	0	1
2	$\alpha = \omega$	2	3	1	3	1	3	1	1
3	$\alpha + 1 = \omega^2$	3	2	2	1	DNE	2	1	1

+	0	1	2	3
0	0	1	2	3
1	1	0	3	2
2	2	3	0	1
3	3	2	1	0

$\cdot$	1	2	3
1	1	2	3
2	2	3	1
3	3	1	2

$2^0 = 1$
$2^1 = 2$
$2^2 = 3$
$2^3 = 1$