Table 1: Classification of Quadratic APN Trinomials (CCZ-inequivalent with infinite monomial families) in Small Dimensions with Coefficients as 1

n	N°	Functions	Families from Tables 5	Relation to [6]
6	–	–	–	–
7	7.1	$x^{20}+x^6+x^3$	–	Table 7 : $N^\circ 8.1$
	7.2	$x^{34}+x^{18}+x^5$	–	7 : $N^\circ 2.1$
8	8.1	$x^{72}+x^6+x^3$	$N^\circ 5$	Table 9 : $N^\circ 1.3$
	8.2	$x^{72}+x^{36}+x^3$	–	9 : $N^\circ 1.4$
9	–	–	–	–
10	–	–	–	–
11	–	–	–	–

Table 2: Classification of Quadratic APN Quadrinomials (CCZ-inequivalent with infinite monomial families) in Small Dimensions with Coefficients as 1

n	N°	Functions	Families from Tables 5	Relation to [6]
6	–	–	–	–
7	7.1	$x^{72}+x^{40}+x^{12}+x^3$	–	Table 7 : $N^\circ 12.1$
	7.2	$x^{33}+x^{17}+x^{12}+x^3$	–	7 : $N^\circ 10.1$
	7.3	$x^{34}+x^{33}+x^{10}+x^3$	–	7 : $N^\circ 2.2$
	7.4	$x^{66}+x^{34}+x^{20}+x^3$	–	7 : $N^\circ 11.1$
	7.5	$x^{68}+x^{18}+x^5+x^3$	–	7 : $N^\circ 8.1$
	7.6	$x^{66}+x^{18}+x^9+x^3$	–	7 : $N^\circ 9.1$
8	–	–	–	–
9	–	–	–	–
10	–	–	–	–
11	–	–	–	–

Table 3: Classification of Quadratic APN Pentanomials (CCZ-inequivalent with infinite monomial families) in Small Dimensions with Coefficients as 1

n	N°	Functions	Families from Tables 5	Relation to [6]
6	–	–	–	–
7	7.1	$x^{68}+x^{40}+x^{24}+x^6+x^3$	–	Table 7 : $N^\circ 13.1$
	7.2	$x^{65}+x^{20}+x^{18}+x^6+x^3$	$N^\circ 5$	7 : $N^\circ 1.2$
	7.3	$x^{40}+x^{34}+x^{18}+x^{10}+x$	–	7 : $N^\circ 12.1$
	7.4	$x^{48}+x^{40}+x^{10}+x^9+x^3$	–	7 : $N^\circ 2.1$
	7.5	$x^{33}+x^9+x^6+x^5+x^3$	–	7 : $N^\circ 11.1$
	7.6	$x^{40}+x^{36}+x^{34}+x^{24}+x^3$	–	7 : $N^\circ 10.1$
	7.7	$x^{24}+x^{10}+x^9+x^6+x^3$	–	7 : $N^\circ 2.2$
	7.8	$x^{65}+x^{36}+x^{20}+x^{17}+x^3$	–	7 : $N^\circ 14.1$
	7.9	$x^{40}+x^{33}+x^{17}+x^5+x^3$	–	7 : $N^\circ 8.1$
	7.10	$x^{36}+x^{33}+x^{18}+x^9+x^5$	–	7 : $N^\circ 10.2$
8	8.1	$x^{36}+x^{33}+x^9+x^6+x^3$	–	Table 9 : $N^\circ 1.4$
	8.2	$x^{72}+x^{66}+x^{12}+x^6+x^3$	$N^\circ 5$	9 : $N^\circ 1.3$
	8.3	$x^{130}+x^{66}+x^{40}+x^{12}+x^3$	–	9 : $N^\circ 6.1$
	8.4	$x^{66}+x^{40}+x^{18}+x^5+x^3$	–	9 : $N^\circ 5.1$
9	–	–	–	–
10	–	–	–	–
11	11.1	$x^{12}+x^{10}+x^9+x^5+x^3$	–	–
	11.2	$x^{258}+x^{257}+x^{18}+x^{17}+x^3$	–	–
	11.3	$x^{96}+x^{66}+x^{34}+x^{33}+x^3$	–	–
	11.4	$x^{80}+x^{68}+x^{65}+x^{17}+x^5$	–	–
	11.5	$x^{260}+x^{257}+x^{36}+x^{33}+x^5$	–	–

Table 4: Classification of Quadratic APN Hexanomial (CCZ-inequivalent with infinite monomial families) in Small Dimensions with Coefficients as 1

n	N°	Functions	Families from Tables 5	Relation to [6]
6	–	–	–	–
7	7.1	$x^{34}+x^{33}+x^{12}+x^6+x^5+x^3$	–	Table 7 : $N^\circ 14.2$
	7.2	$x^{40}+x^{24}+x^{20}+x^9+x^5+x^3$	–	7 : $N^\circ 14.1$
	7.3	$x^{33}+x^{24}+x^{20}+x^{18}+x^{12}+x^3$	–	7 : $N^\circ 12.1$
	7.4	$x^{24}+x^{17}+x^{12}+x^{10}+x^6+x^3$	–	7 : $N^\circ 2.1$
	7.5	$x^{40}+x^{34}+x^{18}+x^{17}+x^5+x^3$	$N^\circ 5$	7 : $N^\circ 1.2$
	7.6	$x^{48}+x^{40}+x^{18}+x^{10}+x^5+x^3$	–	7 : $N^\circ 11.1$
	7.7	$x^{40}+x^{12}+x^{10}+x^9+x^5+x^3$	–	7 : $N^\circ 2.2$
	7.8	$x^{34}+x^{24}+x^{10}+x^9+x^6+x^3$	–	7 : $N^\circ 9.1$
	7.9	$x^{34}+x^{33}+x^{20}+x^{17}+x^{10}+x^3$	–	7 : $N^\circ 13.1$
	7.10	$x^{36}+x^{33}+x^{24}+x^9+x^6+x^3$	–	7 : $N^\circ 10.1$
	7.11	$x^{40}+x^{36}+x^{20}+x^{10}+x^5+x^3$	–	7 : $N^\circ 10.2$
	7.12	$x^{36}+x^{34}+x^{20}+x^{10}+x^9+x^3$	–	7 : $N^\circ 8.1$
8	8.1	$x^{68}+x^{34}+x^{17}+x^{12}+x^9+x^3$	–	Table 9 : $N^\circ 5.1$
	8.2	$x^{72}+x^{40}+x^{34}+x^{20}+x^{12}+x^3$	$N^\circ 5$	9 : $N^\circ 6.1$
	8.3	$x^{72}+x^{66}+x^{34}+x^{18}+x^{10}+x^5$	–	9 : $N^\circ 4.1$
9	–	–	–	–
10	–	–	–	–
11	–	–	–	–

Table 5: Known classes of quadratic APN polynomials CCZ-inequivalent to APN monomials on $\mathbb{F}_{2^n}$ (u is primitive in $\mathbb{F}_{2^n}^*$)

No.	Functions	Conditions
1-2 [3]	$x^{2^s+1}+u^{2^k-1}x^{2^{ik}+2^{mk+s}}$	$n=pk$, $\gcd(k,3)=\gcd(s,3k)=1$, $p\in\{3,4\}$, $i=sk \bmod p$, $m=p-i$, $n\geq 12$
3 [2]	$x^{2^{2i}+2^i}+bx^{q+1}+cx^{q(2^{2i}+2^i)}$	$q=2^m$, $n=2m$, $\gcd(i,m)=1$, $\gcd(2^i+1,q+1)\neq 1, cb^q+b\neq 0$, $c\notin\{\lambda^{(2^i+1)(q-1)},\lambda\in\mathbb{F}_{2^n}\}, c^{q+1}=1$
4 [2]	$x(x^{2^i}+x^q+cx^{2^iq})$ $+x^{2^i}(c^qx^q+sx^{2^iq})+x^{(2^i+1)q}$	$q=2^m, n=2m, \gcd(i,m)=1$, $c\in\mathbb{F}_{2^n}, s\in\mathbb{F}_{2^n}\setminus\mathbb{F}_q$, $X^{2^i+1}+cX^{2^i}+c^qX+1$ is irreducible over $\mathbb{F}_{2^n}$
5 [4, 5]	$x^3+a^{-1}\mathrm{tr}_n(a^3x^9)$	$a\neq 0$
6 [5]	$x^3+a^{-1}\mathrm{tr}_n^3(a^3x^9+a^6x^{18})$	$3\|n$, $a\neq 0$
7 [5]	$x^3+a^{-1}\mathrm{tr}_n^3(a^6x^{18}+a^{12}x^{36})$	$3\|n$, $a\neq 0$
8-10 [1]	$ux^{2^s+1}+u^{2^k}x^{2^{-k}+2^{k+s}}+$ $vx^{2^{-k}+1}+wu^{2^k+1}x^{2^s+2^{k+s}}$	$n=3k$, $\gcd(k,3)=\gcd(s,3k)=1$, $v,w\in\mathbb{F}_{2^k}, vw\neq 1$, $3\|(k+s)$
11 [7]	$(x+x^{2^m})^{2^k+1}+$ $u^{(2^n-1)/(2^m-1)}(ux+u^{2^m}x^{2^m})^{(2^k+1)2^i}+$ $u(x+x^{2^m})(ux+u^{2^m}x^{2^m})$	$m\geq 2$, $2\|m$, $n=2m$, $\gcd(k,m)=1$, i is even

References

[1] Carl Bracken, Eimear Byrne, Nadya Markin, and Gary Mcguire. New families of quadratic almost perfect nonlinear trinomials and multinomials. *Finite Fields and Their Applications*, 14(3):703–714, 2008.

[2] Lilya Budaghyan and Claude Carlet. Classes of quadratic apn trinomials and hexanomials and related structures. *IEEE Transactions on Information Theory*, 54(5):2354–2357, 2008.

[3] Lilya Budaghyan, Claude Carlet, and Gregor Leander. Two classes of quadratic apn binomials inequivalent to power functions. *IEEE Transactions on Information Theory*, 54(9):4218–4229, 2008.

[4] Lilya Budaghyan, Claude Carlet, and Gregor Leander. Constructing new apn functions from known ones. *Finite Fields and Their Applications*, 15(2):150–159, 2009.

[5] Lilya Budaghyan, Claude Carlet, and Gregor Leander. On a construction of quadratic apn functions. In *Information Theory Workshop, 2009. ITW 2009. IEEE*, pages 374–378. IEEE, 2009.

[6] Yves Edel and Alexander Pott. A new almost perfect nonlinear function which is not quadratic. *Adv. in Math. of Comm.*, 3(1):59–81, 2009.

[7] Yue Zhou and Alexander Pott. A new family of semifields with 2 parameters. *Advances in Mathematics*, 234:43–60, 2013.