# 1 BLT set 6 over GF(29)

Points on the quadric $x_0^2 + x_1x_2 + x_3x_4$:

$P_1 = (0, 1, 0, 0, 0)$

$P_2 = (0, 0, 1, 0, 0)$

$P_3 = (0, 1, 14, 28, 14)$

$P_4 = (0, 1, 18, 14, 7)$

$P_5 = (0, 1, 14, 4, 11)$

$P_6 = (0, 1, 15, 24, 3)$

$P_7 = (1, 27, 6, 4, 10)$

$P_8 = (1, 2, 5, 2, 9)$

$P_9 = (1, 15, 24, 5, 9)$

$P_{10} = (1, 14, 24, 20, 2)$

$P_{11} = (1, 28, 15, 16, 19)$

$P_{12} = (1, 1, 26, 15, 4)$

$P_{13} = (1, 20, 27, 3, 13)$

$P_{14} = (1, 9, 12, 23, 23)$

$P_{15} = (1, 3, 5, 22, 23)$

$P_{16} = (1, 26, 16, 25, 10)$

$P_{17} = (1, 15, 24, 26, 14)$

$P_{18} = (1, 14, 25, 12, 7)$

$P_{19} = (1, 18, 5, 28, 4)$

$P_{20} = (1, 11, 22, 17, 13)$

$P_{21} = (1, 23, 19, 20, 10)$

$P_{22} = (1, 6, 27, 14, 7)$

$P_{23} = (1, 21, 4, 3, 20)$

$P_{24} = (1, 8, 28, 24, 16)$

$P_{25} = (1, 26, 4, 24, 21)$

$P_{26} = (1, 3, 13, 21, 5)$

$P_{27} = (1, 27, 1, 17, 12)$

$P_{28} = (1, 2, 4, 15, 11)$

$P_{29} = (1, 18, 4, 4, 18)$

$P_{30} = (1, 11, 25, 22, 27)$

Stabilizer of order 8 is generated by:

$$g_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 28 & 15 & 1 & 15 \\ 0 & 0 & 28 & 0 & 0 \\ 0 & 0 & 15 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{pmatrix}$$

$$g_2 = \begin{pmatrix} 5 & 0 & 19 & 28 & 24 \\ 24 & 12 & 25 & 4 & 13 \\ 0 & 0 & 17 & 0 & 0 \\ 12 & 0 & 19 & 26 & 19 \\ 14 & 0 & 16 & 17 & 26 \end{pmatrix}$$

$$g_3 = \begin{pmatrix} 18 & 0 & 20 & 1 & 25 \\ 10 & 22 & 19 & 8 & 15 \\ 0 & 27 & 22 & 1 & 15 \\ 27 & 15 & 15 & 13 & 27 \\ 15 & 1 & 8 & 20 & 13 \end{pmatrix}$$

Induced action on the BLT-set:

The induced group has order 8 and is generated by:

$g_1$ =(1, 3)(5, 6)(7, 8)(9, 10)(11, 12)(13, 14)(15, 16)(17, 18)(19, 20)(21, 22)(23, 24)(25, 26)(27, 28)(29, 30)

$g_2$ =(1, 9, 3, 10)(5, 7, 6, 8)(11, 25, 12, 26)(13, 16, 14, 15)(17, 28, 18, 27)(19, 30, 20, 29)(21, 23, 22, 24)

$g_3$ =(1, 24)(2, 4)(3, 23)(5, 11)(6, 12)(7, 26)(8, 25)(9, 22)(10, 21)(13, 14)(17, 30)(18, 29)(19, 28)(20, 27)

Kernel has order 1 and is generated by:

There are 5 orbits on the BLT set.

The orbit length are $[8^3, 4, 2]$

The orbits are:

$O_0 = \{1, 3, 9, 10, 21, 22, 23, 24\}$ (length 8)

$O_1 = \{2, 4\}$ (length 2)

$O_2 = \{5, 6, 7, 8, 11, 12, 25, 26\}$ (length 8)

$O_3 = \{13, 14, 15, 16\}$ (length 4)

$O_4 = \{17, 18, 19, 20, 27, 28, 29, 30\}$ (length 8)

The actions induced on the orbits are:

Induced action on orbit $O_0 = \{1, 3, 9, 10, 21, 22, 23, 24\}$ (length 8)

The induced group has order 8 and is generated by:

$g_1$ =(1, 2)(3, 4)(5, 6)(7, 8)

$g_2$ =(1, 3, 2, 4)(5, 7, 6, 8)

$g_3$ =(1, 8)(2, 7)(3, 6)(4, 5)

Kernel has order 1 and is generated by:

Induced action on orbit $O_1 = \{2, 4\}$ (length 2)

The induced group has order 2 and is generated by:

$g_1$ =id

$g_2$ =id

$g_3$ =(1, 2)

Kernel has order 4 and is generated by:

$$b_1 = \begin{pmatrix} 5 & 0 & 19 & 28 & 24 \\ 24 & 12 & 25 & 4 & 13 \\ 0 & 0 & 17 & 0 & 0 \\ 12 & 0 & 19 & 26 & 19 \\ 14 & 0 & 16 & 17 & 26 \end{pmatrix}$$

The kernel has 6324 orbits on the quadric.

The orbit length are $[4^{6307}, 2^{15}, 1^2]$

Induced action on orbit $O_{44} = \{53, 3733\}$ (length 2)

The induced group has order 2 and is generated by:

$g_1$ =(1, 2)

Kernel has order 2 and is generated by:

$$b_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 28 & 15 & 1 & 15 \\ 0 & 0 & 28 & 0 & 0 \\ 0 & 0 & 15 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{pmatrix}$$

The kernel has 12646 orbits on the quadric.

The orbit length are $[2^{12614}, 1^{32}]$

Induced action on orbit $O_0 = \{1, 145\}$ (length 2)

The induced group has order 2 and is generated by:

$g_1$ =(1, 2)

Kernel has order 1 and is generated by:

Induced action on orbit $O_2 = \{5, 6, 7, 8, 11, 12, 25, 26\}$ (length 8)

The induced group has order 8 and is generated by:

$g_1$ =(1, 2)(3, 4)(5, 6)(7, 8)

$g_2$ =(1, 3, 2, 4)(5, 7, 6, 8)

$g_3$ =(1, 5)(2, 6)(3, 8)(4, 7)

Kernel has order 1 and is generated by:

Induced action on orbit $O_3 = \{13, 14, 15, 16\}$ (length 4)

The induced group has order 8 and is generated by:

$g_1$ =(1, 2)(3, 4)

$g_2$ =(1, 4, 2, 3)

$g_3$ =(1, 2)

Kernel has order 1 and is generated by:

Induced action on orbit $O_4 = \{17, 18, 19, 20, 27, 28, 29, 30\}$ (length 8)

The induced group has order 8 and is generated by:

$g_1$ =(1, 2)(3, 4)(5, 6)(7, 8)

$g_2$ =(1, 6, 2, 5)(3, 8, 4, 7)

$g_3$ =(1, 8)(2, 7)(3, 6)(4, 5)

Kernel has order 1 and is generated by: