1 BLT set 1 over GF(31)

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

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

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

$P_3 = (0, 1, 10, 30, 10)$

$P_4 = (0, 1, 18, 15, 5)$

$P_5 = (0, 1, 8, 10, 24)$

$P_6 = (0, 1, 20, 23, 18)$

$P_7 = (0, 1, 28, 3, 1)$

$P_8 = (0, 1, 2, 26, 19)$

$P_9 = (0, 1, 19, 6, 2)$

$P_{10} = (0, 1, 10, 1, 21)$

$P_{11} = (0, 1, 25, 7, 23)$

$P_{12} = (0, 1, 14, 19, 27)$

$P_{13} = (0, 1, 2, 5, 12)$

$P_{14} = (0, 1, 18, 16, 26)$

$P_{15} = (0, 1, 1, 20, 17)$

$P_{16} = (0, 1, 14, 12, 4)$

$P_{17} = (0, 1, 25, 24, 8)$

$P_{18} = (0, 1, 19, 25, 29)$

$P_{19} = (0, 1, 9, 2, 11)$

$P_{20} = (0, 1, 7, 17, 16)$

$P_{21} = (0, 1, 4, 22, 28)$

$P_{22} = (0, 1, 8, 21, 7)$

$P_{23} = (0, 1, 1, 11, 14)$

$P_{24} = (0, 1, 28, 28, 30)$

$P_{25} = (0, 1, 5, 27, 9)$

$P_{26} = (0, 1, 20, 8, 13)$

$P_{27} = (0, 1, 16, 18, 6)$

$P_{28} = (0, 1, 5, 4, 22)$

$P_{29} = (0, 1, 7, 14, 15)$

$P_{30} = (0, 1, 4, 9, 3)$

$P_{31} = (0, 1, 16, 13, 25)$

$P_{32} = (0, 1, 9, 29, 20)$

Stabilizer of order 1904640 is generated by:

$$g_1 = \begin{pmatrix} 21 & 0 & 0 & 24 & 23 \\ 0 & 30 & 0 & 0 & 0 \\ 0 & 17 & 30 & 19 & 27 \\ 4 & 27 & 0 & 11 & 7 \\ 19 & 19 & 0 & 1 & 11 \end{pmatrix}$$

$$g_2 = \begin{pmatrix} 0 & 0 & 0 & 11 & 17 \\ 0 & 30 & 0 & 0 & 0 \\ 0 & 0 & 30 & 0 & 0 \\ 24 & 0 & 0 & 15 & 5 \\ 21 & 0 & 0 & 14 & 15 \end{pmatrix}$$

$$g_3 = \begin{pmatrix} 24 & 0 & 0 & 19 & 4 \\ 0 & 30 & 0 & 0 & 0 \\ 0 & 0 & 30 & 0 & 0 \\ 2 & 0 & 0 & 3 & 9 \\ 25 & 0 & 0 & 19 & 3 \end{pmatrix}$$

$$g_4 = \begin{pmatrix} 7 & 0 & 0 & 19 & 4 \\ 0 & 2 & 5 & 30 & 10 \\ 0 & 8 & 2 & 18 & 6 \\ 29 & 6 & 10 & 1 & 29 \\ 6 & 18 & 30 & 13 & 1 \end{pmatrix}$$

$$g_5 = \begin{pmatrix} 5 & 0 & 0 & 17 & 15 \\ 0 & 30 & 0 & 0 & 0 \\ 0 & 0 & 30 & 0 & 0 \\ 23 & 0 & 0 & 28 & 11 \\ 24 & 0 & 0 & 6 & 28 \end{pmatrix}$$

$$g_6 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 30 & 0 & 0 & 0 \\ 0 & 0 & 30 & 0 & 0 \\ 0 & 0 & 0 & 30 & 0 \\ 0 & 0 & 0 & 0 & 30 \end{pmatrix}$$

$$g_7 = \begin{pmatrix} 2 & 0 & 0 & 3 & 30 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 4 & 1 & 9 & 3 \\ 16 & 3 & 0 & 16 & 15 \\ 14 & 9 & 0 & 11 & 16 \end{pmatrix}$$

$$g_8 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 5 & 0 & 0 & 0 \\ 0 & 0 & 25 & 0 & 0 \\ 0 & 0 & 0 & 30 & 0 \\ 0 & 0 & 0 & 0 & 30 \end{pmatrix}$$

$$g_9 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 21 & 0 & 0 & 0 \\ 0 & 0 & 3 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

Induced action on the BLT-set:

The induced group has order 29760 and is generated by:

g_1 =(2, 6)(3, 5)(7, 8)(9, 10)(11, 12)(13, 14)(15, 16)(17, 18)(19, 20)(21, 22)(23, 24)(25, 26)(27,

28)(29, 30)(31, 32)

g_2 =id

g_3 =id

g_4 =(1, 4)(2, 5)(3, 6)(7, 8)(9, 11)(10, 12)(13, 15)(14, 16)(17, 19)(18, 20)(21, 23)(22, 24)(25, 27)(26, 28)(29, 31)(30, 32)

g_5 =id

g_6 =id

g_7 =(2, 5)(3, 4)(6, 10)(7, 30)(8, 17)(9, 14)(11, 27)(12, 24)(13, 22)(16, 32)(18, 25)(19, 31)(20, 23)(21, 26)(28, 29)

g_8 =(3, 18, 8, 10, 9, 13)(4, 24, 31, 14, 7, 27)(5, 32, 12, 22, 19, 16)(6, 29, 21, 26, 20, 30)(11, 23, 28, 17, 15, 25)

g_9 =(3, 24, 21, 28, 16, 13, 4, 29, 23, 19, 9, 27, 6, 11, 22, 10, 7, 30, 25, 12, 8, 14, 20, 15, 32, 18, 31, 26, 17, 5)

Kernel has order 64 and is generated by:

$$b_1 = \begin{pmatrix} 0 & 0 & 0 & 11 & 17 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 24 & 0 & 0 & 16 & 26 \\ 21 & 0 & 0 & 17 & 16 \end{pmatrix}$$

$$b_2 = \begin{pmatrix} 5 & 0 & 0 & 14 & 16 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 23 & 0 & 0 & 3 & 20 \\ 24 & 0 & 0 & 25 & 3 \end{pmatrix}$$

$$b_3 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

$$b_4 = \begin{pmatrix} 30 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

The kernel has 993 orbits on the quadric.

The orbit length are $[32^{961}, 1^{32}]$

Induced action on orbit $O_2 = \{3, 64, 2855, 2916, 2977, 3038, 3099, 3160, 3221, 3282, 3343, 3404, 3465, 3526, 3587, 3$

(length 32)

The induced group has order 64 and is generated by:

g_1 =(1, 22)(2, 13)(3, 6)(4, 12)(5, 26)(7, 10)(8, 18)(9, 32)(11, 31)(14, 15)(16, 23)(19, 24)(20, 25)(21, 28)(29, 30)

g_2 =(1, 14, 12, 9, 18, 30, 19, 7, 13, 20, 31, 3, 27, 6, 11, 25, 2, 10, 24, 29, 8, 32, 4, 15, 22, 28, 16, 5, 17, 26, 23, 21)

g_3 =id

g_4 =(3, 32)(4, 31)(5, 30)(6, 29)(7, 28)(8, 27)(9, 26)(10, 25)(11, 24)(12, 23)(13, 22)(14, 21)(15, 20)(16, 19)(17, 18)

Kernel has order 1 and is generated by:

There are 1 orbits on the BLT set.

The orbit length are [32]

The orbits are:

$O_0 = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32\}$ (length 32)