1 BLT set 1 over GF\(^{(27)}\)

Points on the quadric \(x_0^2 + x_1x_2 + x_3x_4\):

\[
\begin{align*}
P_1 & = (0, 1, 0, 0, 0) \\
P_2 & = (0, 0, 1, 0, 0) \\
P_3 & = (0, 1, 1, 2, 1) \\
P_4 & = (0, 1, 1, 2) \\
P_5 & = (0, 1, 25, 11, 19) \\
P_6 & = (0, 1, 20, 15, 21) \\
P_7 & = (0, 1, 22, 12, 24) \\
P_8 & = (0, 1, 9, 6, 3) \\
P_9 & = (0, 1, 15, 18, 9) \\
P_{10} & = (0, 1, 7, 20, 10) \\
P_{11} & = (0, 1, 25, 19, 11) \\
P_{12} & = (0, 1, 20, 21, 15) \\
P_{13} & = (0, 1, 22, 24, 12) \\
P_{14} & = (0, 1, 9, 3, 6) \\
P_{15} & = (0, 1, 6, 17, 22) \\
P_{16} & = (0, 1, 11, 13, 26) \\
P_{17} & = (0, 1, 8, 14, 25) \\
P_{18} & = (0, 1, 15, 9, 18) \\
P_{19} & = (0, 1, 16, 4, 8) \\
P_{20} & = (0, 1, 12, 23, 16) \\
P_{21} & = (0, 1, 6, 22, 17) \\
P_{22} & = (0, 1, 16, 8, 4) \\
P_{23} & = (0, 1, 12, 16, 23) \\
P_{24} & = (0, 1, 13, 5, 7) \\
P_{25} & = (0, 1, 7, 10, 20) \\
P_{26} & = (0, 1, 8, 25, 14)
\end{align*}
\]
$P_{27} = (0, 1, 13, 7, 5)$

$P_{28} = (0, 1, 11, 26, 13)$

Stabilizer of order 3302208 is generated by:

\[
g_1 = \begin{pmatrix}
2 & 0 & 0 & 0 & 0 \\
0 & 1 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 1 & 0 \\
0 & 0 & 0 & 0 & 1
\end{pmatrix},
\]

\[
g_2 = \begin{pmatrix}
21 & 0 & 0 & 26 & 26 \\
0 & 1 & 0 & 0 & 0 \\
0 & 1 & 1 & 2 & 1 \\
26 & 2 & 0 & 17 & 16 \\
26 & 1 & 0 & 16 & 17
\end{pmatrix},
\]

\[
g_3 = \begin{pmatrix}
19 & 0 & 0 & 16 & 16 \\
0 & 2 & 0 & 0 & 0 \\
0 & 0 & 2 & 0 & 0 \\
16 & 0 & 0 & 9 & 10 \\
16 & 0 & 0 & 10 & 9
\end{pmatrix},
\]

\[
g_4 = \begin{pmatrix}
2 & 0 & 0 & 0 & 0 \\
0 & 1 & 0 & 0 & 0 \\
0 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 1 & 0 \\
0 & 0 & 0 & 0 & 1
\end{pmatrix},
\]
Induced action on the BLT-set:

The induced group has order 58968 and is generated by:

\( g_1 = \text{id} \)
$g_2 = (2, 3, 4)(8, 9, 10)(11, 12, 13)(14, 15, 16)(17, 18, 19)(20, 21, 22)(23, 24, 25)(26, 27, 28)$

$g_3 =$ id

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

$g_5 = (1, 4, 2, 3)(5, 26, 24, 28, 6, 10, 14, 9, 7, 21, 19, 20)(8, 17, 13, 16, 22, 25, 11, 18, 27, 15, 12, 23)$

$g_6 = (3, 4)(5, 13, 6, 11, 7, 12)(8, 24, 22, 14, 27, 19)(9, 16, 20, 18, 28, 23)(10, 17, 21, 25, 26, 15)$


$g_8 = (2, 14, 19, 3, 21, 12, 17, 22, 26, 13, 5, 6, 23)(4, 7, 9, 20, 8, 15, 10, 24, 16, 28, 11, 27, 18)$

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

Kernel has order 56 and is generated by:

$$b_1 = \begin{pmatrix}
9 & 0 & 0 & 24 & 24 \\
0 & 2 & 0 & 0 & 0 \\
0 & 0 & 2 & 0 & 0 \\
12 & 0 & 0 & 10 & 11 \\
12 & 0 & 0 & 11 & 10
\end{pmatrix}.$$ 

$$b_2 = \begin{pmatrix}
26 & 0 & 0 & 21 & 21 \\
0 & 2 & 0 & 0 & 0 \\
0 & 0 & 2 & 0 & 0 \\
15 & 0 & 0 & 24 & 25 \\
15 & 0 & 0 & 25 & 24
\end{pmatrix}.$$
The kernel has 757 orbits on the quadric.

The orbit length are \([28^{729}, 1^{28}]\)
Induced action on orbit $O_2 = \{3, 56, 2163, 2216, 2269, 2322, 2375, 2428, 2481, 2534, 2587, 2640, 2693, 2746, 2799, 2852, 2905, 2958, 3011, 3064, 3117, 3170, 3223, 3276, 3329, 3382, 3435, 3488, 3541\}$ (length 28)

The induced group has order 56 and is generated by:


$g_3 = \text{id}$

$g_4 = \text{id}$


$g_6 = (3, 4)(5, 8)(6, 10)(7, 9)(11, 20)(12, 22)(13, 21)(14, 26)(15, 28)(16, 27)(17, 23)(18, 25)(19, 24)$

Kernel has order 1 and is generated by:

There are 1 orbits on the BLT set.

The orbit length are [28]

The orbits are:

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