BLT-sets of Q(4, 11)

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Contents

Chapter 1

Summary

There are 4 BLT-sets.

Chapter 2

Invariants

Chapter 3

The BLT-Sets

3.1 Isomorphism Type 0

Stabilizer has order 31680
Plane intersection type is 12
Plane invariant is

$$\begin{bmatrix} 12 \end{bmatrix}$$

$\rightarrow$	1_1
12_0	1

$\downarrow$	1_1
12_0	12

$C_0 = \{0,1,2,3,4,5,6,7,8,9,10,11\}_{12}$
$C_1 = \{0\}_1$

$\rightarrow$	1_1
12_0	1

$\downarrow$	1_1
12_0	12

$C_0 = \{0,1,2,3,4,5,6,7,8,9,10,11\}_{12}$
$C_1 = \{0\}_1$
Column cell 1:
Order of the group that is induced on the object is 1320
Number of ancestors on 5-sets is 2.
Number of orbits on 5-sets is 2.
With 1 orbits on the object
Orbit lengths: 12
The points by ranks:

i	Rank	i	Rank	i	Rank	i	Rank
0	0	3	55	6	57	9	61
1	1	4	56	7	58	10	62
2	54	5	60	8	59	11	63

The points:

$$P_0 = (0,1,0,0,0)P_1 = (0,0,1,0,0)P_2 = (0,1,5,10,5)P_3 = (0,1,4,5,8)$$
$$P_4 = (0,1,3,7,9)P_5 = (0,1,1,3,7)P_6 = (0,1,1,8,4)P_7 = (0,1,9,2,1)$$
$$P_8 = (0,1,9,9,10)P_9 = (0,1,3,4,2)P_{10} = (0,1,4,6,3)P_{11} = (0,1,5,1,6)$$

Stabilizer of order 31680 is generated by:

$$g_1 = \begin{bmatrix} 5 & 0 & 0 & 0 & 0 \\ 0 & 6 & 0 & 0 & 0 \\ 0 & 0 & 6 & 0 & 0 \\ 0 & 0 & 0 & 6 & 0 \\ 0 & 0 & 0 & 0 & 6 \end{bmatrix}$$

with 144 fixed points

$$g_2 = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 6 & 0 & 0 & 0 \\ 0 & 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

with 14 fixed points

$$g_3 = \begin{bmatrix} 4 & 0 & 0 & 9 & 1 \\ 0 & 6 & 0 & 0 & 0 \\ 0 & 0 & 6 & 0 & 0 \\ 5 & 0 & 0 & 5 & 6 \\ 1 & 0 & 0 & 2 & 5 \end{bmatrix}$$

with 12 fixed points

$$g_4 = \begin{bmatrix} 9 & 0 & 0 & 3 & 4 \\ 0 & 4 & 0 & 0 & 0 \\ 0 & 5 & 4 & 2 & 1 \\ 2 & 1 & 0 & 10 & 4 \\ 7 & 2 & 0 & 5 & 10 \end{bmatrix}$$

with 14 fixed points

$$g_5 = \begin{bmatrix} 6 & 0 & 0 & 8 & 7 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 4 & 5 & 8 \\ 9 & 4 & 0 & 7 & 1 \\ 4 & 8 & 0 & 4 & 7 \end{bmatrix}$$

with 2 fixed points

$$g_6 = \begin{bmatrix} 2 & 0 & 0 & 1 & 5 \\ 0 & 8 & 7 & 3 & 7 \\ 0 & 0 & 8 & 0 & 0 \\ 8 & 0 & 7 & 6 & 4 \\ 6 & 0 & 3 & 5 & 6 \end{bmatrix}$$

with 12 fixed points

3.2 Isomorphism Type 1

Stabilizer has order 288
Plane intersection type is $6^2\ 4^9\ 3^{144}$
Plane invariant is

$$\begin{bmatrix} 6 & 0 \\ 0 & 6 \end{bmatrix}$$

$\rightarrow$	2_1
12_0	1

$\downarrow$	2_1
12_0	6

$C_0 = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11\}_{12}$
$C_1 = \{0, 1\}_2$

$\rightarrow$	2_1	9_2
12_0	1	3

$\downarrow$	2_1	9_2
12_0	6	4

$C_0 = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11\}_{12}$
$C_1 = \{0, 10\}_2$
$C_2 = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}_9$
Column cell 1:
Column cell 2:
Order of the group that is induced on the object is 288
Number of ancestors on 5-sets is 22.
Number of orbits on 5-sets is 13.
With 1 orbits on the object
Orbit lengths: 12
The points by ranks:

i	Rank	i	Rank	i	Rank	i	Rank
0	0	3	55	6	1036	9	1009
1	1	4	56	7	602	10	1135
2	54	5	60	8	918	11	591

The points:

$$P_0 = (0,1,0,0,0) P_1 = (0,0,1,0,0) P_2 = (0,1,5,10,5) P_3 = (0,1,4,5,8)$$

$$P_4 = (0,1,3,7,9) P_5 = (0,1,1,3,7) P_6 = (1,9,4,9,2) P_7 = (1,3,5,6,1)$$

$$P_8 = (1,1,9,4,3) P_9 = (1,10,2,5,9) P_{10} = (1,8,6,9,8) P_{11} = (1,2,7,7,1)$$

Stabilizer of order 288 is generated by:

$$g_1 = \begin{bmatrix} 4 & 0 & 0 & 5 & 3 \\ 0 & 3 & 0 & 0 & 0 \\ 0 & 0 & 3 & 0 & 0 \\ 4 & 0 & 0 & 9 & 8 \\ 3 & 0 & 0 & 10 & 9 \end{bmatrix}$$

with 12 fixed points

$$g_2 = \begin{bmatrix} 3 & 0 & 0 & 7 & 2 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 10 & 1 \\ 9 & 0 & 0 & 4 & 10 \end{bmatrix}$$

with 122 fixed points

$$g_3 = \begin{bmatrix} 9 & 0 & 0 & 1 & 5 \\ 0 & 3 & 0 & 0 & 0 \\ 0 & 0 & 3 & 0 & 0 \\ 8 & 0 & 0 & 8 & 3 \\ 6 & 0 & 0 & 1 & 8 \end{bmatrix}$$

with 122 fixed points

$$g_4 = \begin{bmatrix} 1 & 0 & 0 & 4 & 9 \\ 0 & 2 & 0 & 0 & 0 \\ 0 & 8 & 2 & 1 & 6 \\ 1 & 6 & 0 & 5 & 2 \\ 9 & 1 & 0 & 8 & 5 \end{bmatrix}$$

with 2 fixed points

$$g_5 = \begin{bmatrix} 2 & 0 & 0 & 1 & 5 \\ 0 & 8 & 7 & 3 & 7 \\ 0 & 0 & 8 & 0 & 0 \\ 8 & 0 & 7 & 6 & 4 \\ 6 & 0 & 3 & 5 & 6 \end{bmatrix}$$

with 12 fixed points

$$g_6 = \begin{bmatrix} 7 & 0 & 0 & 2 & 10 \\ 0 & 7 & 10 & 5 & 8 \\ 0 & 8 & 0 & 0 & 0 \\ 5 & 7 & 0 & 10 & 3 \\ 1 & 3 & 0 & 1 & 10 \end{bmatrix}$$

with 2 fixed points

$$g_7 = \begin{bmatrix} 0 & 9 & 5 & 7 & 9 \\ 8 & 6 & 10 & 6 & 5 \\ 10 & 8 & 6 & 5 & 10 \\ 10 & 10 & 5 & 1 & 4 \\ 9 & 5 & 6 & 10 & 1 \end{bmatrix}$$

with 12 fixed points

3.3 Isomorphism Type 2

Stabilizer has order 144
Plane intersection type is 4^{18} 3^{148}
Plane invariant is too big (18 planes)

$\rightarrow$	18_1
12_0	6

$\downarrow$	18_1
12_0	4

$C_0 = \{0,1,2,3,4,5,6,7,8,9,10,11\}_{12}$
$C_1 = \{0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17\}_{18}$

$\rightarrow$	18_1
12_0	6

$\downarrow$	18_1
12_0	4

$C_0 = \{0,1,2,3,4,5,6,7,8,9,10,11\}_{12}$
$C_1 = \{0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17\}_{18}$
Column cell 1:
Order of the group that is induced on the object is 144
Number of ancestors on 5-sets is 14.
Number of orbits on 5-sets is 13.
With 1 orbits on the object
Orbit lengths: 12
The points by ranks:

i	Rank	i	Rank	i	Rank	i	Rank
0	0	3	56	6	1054	9	930
1	1	4	110	7	113	10	1419
2	54	5	694	8	918	11	1415

The points:

$$P_0 = (0,1,0,0,0)P_1 = (0,0,1,0,0)P_2 = (0,1,5,10,5)P_3 = (0,1,3,7,9)$$
$$P_4 = (0,1,5,3,2)P_5 = (1,5,1,10,6)P_6 = (1,5,1,8,2)P_7 = (0,1,3,1,8)$$
$$P_8 = (1,1,9,4,3)P_9 = (1,7,8,1,9)P_{10} = (1,8,2,6,10)P_{11} = (1,10,6,6,10)$$

Stabilizer of order 144 is generated by:

$$g_1 = \begin{bmatrix} 5 & 0 & 0 & 8 & 7 \\ 0 & 9 & 0 & 0 & 0 \\ 0 & 0 & 9 & 0 & 0 \\ 9 & 0 & 0 & 2 & 9 \\ 4 & 0 & 0 & 3 & 2 \end{bmatrix}$$

with 122 fixed points

$$g_2 = \begin{bmatrix} 4 & 0 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 & 0 \\ 0 & 0 & 4 & 0 & 0 \\ 0 & 0 & 0 & 0 & 3 \\ 0 & 0 & 0 & 9 & 0 \end{bmatrix}$$

with 122 fixed points

$$g_3 = \begin{bmatrix} 2 & 10 & 0 & 3 & 10 \\ 0 & 1 & 0 & 0 & 0 \\ 5 & 5 & 1 & 9 & 4 \\ 5 & 4 & 0 & 4 & 2 \\ 7 & 9 & 0 & 7 & 4 \end{bmatrix}$$

with 12 fixed points

$$g_4 = \begin{bmatrix} 7 & 0 & 0 & 0 & 0 \\ 0 & 2 & 10 & 9 & 10 \\ 0 & 8 & 2 & 1 & 6 \\ 0 & 6 & 10 & 5 & 10 \\ 0 & 1 & 9 & 7 & 5 \end{bmatrix}$$

with 122 fixed points

$$g_5 = \begin{bmatrix} 8 & 0 & 0 & 0 & 0 \\ 0 & 10 & 8 & 4 & 2 \\ 0 & 2 & 10 & 9 & 10 \\ 0 & 10 & 2 & 1 & 2 \\ 0 & 9 & 4 & 8 & 1 \end{bmatrix}$$

with 12 fixed points

3.4 Isomorphism Type 3

Stabilizer has order 1320
Plane intersection type is 3^{220}
Plane invariant is too big (220 planes)

$\rightarrow$	220_1
12_0	55

$\downarrow$	220_1
12_0	3

$C_0 = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11\}_{12}$
$C_1 = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42,$
Order of the group that is induced on the object is 1320
Number of ancestors on 5-sets is 2.
Number of orbits on 5-sets is 2.
With 1 orbits on the object
Orbit lengths: 12
The points by ranks:

i	Rank
0	0
1	1
2	54

i	Rank
3	95
4	569
5	930

i	Rank
6	1377
7	740
8	1101

i	Rank
9	1366
10	1018
11	1007

The points:

$$P_0 = (0, 1, 0, 0, 0)P_1 = (0, 0, 1, 0, 0)P_2 = (0, 1, 5, 10, 5)P_3 = (0, 1, 5, 5, 10)$$
$$P_4 = (1, 6, 2, 9, 1)P_5 = (1, 7, 8, 1, 9)P_6 = (1, 4, 3, 2, 10)P_7 = (1, 8, 8, 2, 6)$$
$$P_8 = (1, 6, 7, 6, 2)P_9 = (1, 5, 4, 9, 5)P_{10} = (1, 5, 9, 10, 2)P_{11} = (1, 3, 3, 5, 9)$$

Stabilizer of order 1320 is generated by:

$$g_1 = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 10 & 0 & 0 & 0 \\ 0 & 0 & 10 & 0 & 0 \\ 0 & 0 & 0 & 0 & 10 \\ 0 & 0 & 0 & 10 & 0 \end{bmatrix}$$

with 14 fixed points

$$g_2 = \begin{bmatrix} 9 & 0 & 0 & 5 & 6 \\ 0 & 9 & 0 & 0 & 0 \\ 0 & 0 & 5 & 0 & 0 \\ 8 & 0 & 0 & 5 & 7 \\ 3 & 0 & 0 & 7 & 5 \end{bmatrix}$$

with 4 fixed points

$$g_3 = \begin{bmatrix} 8 & 9 & 0 & 10 & 0 \\ 0 & 8 & 0 & 0 & 0 \\ 10 & 7 & 8 & 9 & 1 \\ 0 & 1 & 0 & 3 & 0 \\ 5 & 9 & 0 & 10 & 3 \end{bmatrix}$$

with 14 fixed points

$$g_4 = \begin{bmatrix} 4 & 6 & 0 & 9 & 9 \\ 0 & 6 & 8 & 8 & 5 \\ 3 & 7 & 6 & 5 & 3 \\ 10 & 3 & 5 & 7 & 4 \\ 10 & 5 & 8 & 2 & 7 \end{bmatrix}$$

with 14 fixed points

$$g_5 = \begin{bmatrix} 5 & 0 & 0 & 0 & 0 \\ 0 & 0 & 3 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 5 \\ 0 & 0 & 0 & 5 & 0 \end{bmatrix}$$

with 12 fixed points

Chapter 4

The BLT-Sets in Numeric Form

0, 1, 54, 55, 56, 60, 57, 58, 59, 61, 62, 63
0, 1, 54, 55, 56, 60, 1036, 602, 918, 1009, 1135, 591
0, 1, 54, 56, 110, 694, 1054, 113, 918, 930, 1419, 1415
0, 1, 54, 95, 569, 930, 1377, 740, 1101, 1366, 1018, 1007

```
INT BLT_11_size = 12;
INT BLT_11_nb_reps = 4;
INT BLT_11_reps[] = {
0, 1, 54, 55, 56, 60, 57, 58, 59, 61, 62, 63,
0, 1, 54, 55, 56, 60, 1036, 602, 918, 1009, 1135, 591,
0, 1, 54, 56, 110, 694, 1054, 113, 918, 930, 1419, 1415,
0, 1, 54, 95, 569, 930, 1377, 740, 1101, 1366, 1018, 1007,
};
const BYTE *BLT_11_stab_order[] = {
"31680",
"288",
"144",
"1320",
};
INT BLT_11_stab_gens[] = {
 5,  0,  0,  0,  0,  0,  6,  0,  0,  0,  0,  0,  6,  0,  0,  0,  0,  0,  6,  0,  0,  0,  0,  0,  6,
 1,  0,  0,  0,  0,  0,  6,  0,  0,  0,  0,  0,  2,  0,  0,  0,  0,  0,  1,  0,  0,  0,  0,  0,  1,
 4,  0,  0,  9,  1,  0,  6,  0,  0,  0,  0,  0,  6,  0,  0,  5,  0,  0,  5,  6,  1,  0,  0,  2,  5,
 9,  0,  0,  3,  4,  0,  4,  0,  0,  0,  0,  5,  4,  2,  1,  2,  1,  0, 10,  4,  7,  2,  0,  5, 10,
 6,  0,  0,  8,  7,  0,  1,  0,  0,  0,  0,  1,  4,  5,  8,  9,  4,  0,  7,  1,  4,  8,  0,  4,  7,
 2,  0,  0,  1,  5,  0,  8,  7,  3,  7,  0,  0,  8,  0,  0,  8,  0,  7,  6,  4,  6,  0,  3,  5,  6,
 4,  0,  0,  5,  3,  0,  3,  0,  0,  0,  0,  0,  3,  0,  0,  4,  0,  0,  9,  8,  3,  0,  0, 10,  9,
 3,  0,  0,  7,  2,  0,  1,  0,  0,  0,  0,  0,  1,  0,  0,  1,  0,  0, 10,  1,  9,  0,  0,  4, 10,
 9,  0,  0,  1,  5,  0,  3,  0,  0,  0,  0,  0,  3,  0,  0,  8,  0,  0,  8,  3,  6,  0,  0,  1,  8,
 1,  0,  0,  4,  9,  0,  2,  0,  0,  0,  0,  8,  2,  1,  6,  1,  6,  0,  5,  2,  9,  1,  0,  8,  5,
 2,  0,  0,  1,  5,  0,  8,  7,  3,  7,  0,  0,  8,  0,  0,  8,  0,  7,  6,  4,  6,  0,  3,  5,  6,
 7,  0,  0,  2, 10,  0,  7, 10,  5,  8,  0,  8,  0,  0,  0,  5,  7,  0, 10,  3,  1,  3,  0,  1, 10,
 0,  9,  5,  7,  9,  8,  6, 10,  6,  5, 10,  8,  6,  5, 10, 10, 10,  5,  1,  4,  9,  5,  6, 10,  1,
 5,  0,  0,  8,  7,  0,  9,  0,  0,  0,  0,  0,  9,  0,  0,  9,  0,  0,  2,  9,  4,  0,  0,  3,  2,
 4,  0,  0,  0,  0,  0,  4,  0,  0,  0,  0,  0,  4,  0,  0,  0,  0,  0,  0,  3,  0,  0,  0,  9,  0,
 2, 10,  0,  3, 10,  0,  1,  0,  0,  0,  5,  5,  1,  9,  4,  5,  4,  0,  4,  2,  7,  9,  0,  7,  4,
 7,  0,  0,  0,  0,  0,  2, 10,  9, 10,  0,  8,  2,  1,  6,  0,  6, 10,  5, 10,  0,  1,  9,  7,  5,
 8,  0,  0,  0,  0,  0, 10,  8,  4,  2,  0,  2, 10,  9, 10,  0, 10,  2,  1,  2,  0,  9,  4,  8,  1,
 1,  0,  0,  0,  0,  0, 10,  0,  0,  0,  0,  0, 10,  0,  0,  0,  0,  0,  0, 10,  0,  0,  0, 10,  0,
 9,  0,  0,  5,  6,  0,  9,  0,  0,  0,  0,  0,  5,  0,  0,  8,  0,  0,  5,  7,  3,  0,  0,  7,  5,
 8,  9,  0, 10,  0,  0,  8,  0,  0,  0, 10,  7,  8,  9,  1,  0,  1,  0,  3,  0,  5,  9,  0, 10,  3,
 4,  6,  0,  9,  9,  0,  6,  8,  8,  5,  3,  7,  6,  5,  3, 10,  3,  5,  7,  4, 10,  5,  8,  2,  7,
 5,  0,  0,  0,  0,  0,  0,  3,  0,  0,  0,  1,  0,  0,  0,  0,  0,  0,  0,  5,  0,  0,  0,  5,  0,
```

```
};
INT BLT_11_stab_gens_fst[] = { 0, 6, 13, 18};
INT BLT_11_stab_gens_len[] = { 6, 7, 5, 5};
INT BLT_11_make_element_size = 0;
```