The Cone CUT6

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1 The intrisic informations concerning the graph of extreme rays of CUT6.ext

The graph considered is made of 31 elements.
The group acting on CUT6.ext is ReprS6
Under the group action we have in fact only 3 orbits to consider.
The diameter of the graph is 1.
The list of orbits is with adjacency and Size info:

E1:	0	0	0	1	1	0	0	1	1	0	1	1	1	1	0	30	15
E2:	0	0	1	1	1	0	1	1	1	1	1	1	0	0	0	30	10
E3:	0	0	0	0	1	0	0	0	1	0	0	1	0	1	1	30	6

The representation matrix is:

	E1	E2	E3	Adj.	Size
E1	14	10	6	30	15
E2	15	9	6	30	10
E3	15	10	5	30	6
Size	15	10	6		31

No complemented local graph of size inferior to 20.

1.1 scalar product between elements of orbits

This subsection made sense only if the representation is orthogonal which is the usual case Considering Orbit 1

1. Orbit Size is 15.
2. Norm of elements is 8.
3. Possible scalar product : 4

Considering Orbit 2

1. Orbit Size is 10.
2. Norm of elements is 9.
3. Possible scalar product : 5

Considering Orbit 3

1. Orbit Size is 6.
2. Norm of elements is 5.
3. Possible scalar product : 1

1.2 invariant group of Orbits

The invariant group of x is the set of g such that $g(x) = x$ denoted by G_x.
If x and y are in the same orbit then the groups G_x and G_y are conjuguate.
For any element x we denote O_x its Orbit, we have $|O_x| \times |G_x| = |G|$ We print only nontrivial groups
Invariant group of Orbit 1:

1. Group Size is 48.

2. Elements are : (4 3 2 1 6 5), (4 3 1 2 6 5), (4 2 3 1 6 5), (4 1 3 2 6 5), (4 2 1 3 6 5), (4 1 2 3 6 5), (3 4 2 1 6 5), (3 4 1 2 6 5), (2 4 3 1 6 5), (1 4 3 2 6 5), (2 4 1 3 6 5), (1 4 2 3 6 5), (3 2 4 1 6 5), (3 1 4 2 6 5), (2 3 4 1 6 5), (1 3 4 2 6 5), (2 1 4 3 6 5), (1 2 4 3 6 5), (3 2 1 4 6 5), (3 1 2 4 6 5), (2 3 1 4 6 5), (1 3 2 4 6 5), (2 1 3 4 6 5), (1 2 3 4 6 5), (4 3 2 1 5 6), (4 3 1 2 5 6), (4 2 3 1 5 6), (4 1 3 2 5 6), (4 2 1 3 5 6), (4 1 2 3 5 6), (3 4 2 1 5 6), (3 4 1 2 5 6), (2 4 3 1 5 6), (1 4 3 2 5 6), (2 4 1 3 5 6), (1 4 2 3 5 6), (3 2 4 1 5 6), (3 1 4 2 5 6), (2 3 4 1 5 6), (1 3 4 2 5 6), (2 1 4 3 5 6), (1 2 4 3 5 6), (3 2 1 4 5 6), (3 1 2 4 5 6), (2 3 1 4 5 6), (1 3 2 4 5 6), (2 1 3 4 5 6), (1 2 3 4 5 6)

Invariant group of Orbit 2:

1. Group Size is 72.

2. Elements are : (6 5 4 3 2 1), (6 5 4 3 1 2), (6 5 4 2 3 1), (6 5 4 1 3 2), (6 5 4 2 1 3), (6 5 4 1 2 3), (6 4 5 3 2 1), (6 4 5 3 1 2), (6 4 5 2 3 1), (6 4 5 1 3 2), (6 4 5 2 1 3), (6 4 5 1 2 3), (5 6 4 3 2 1), (5 6 4 3 1 2), (5 6 4 2 3 1), (5 6 4 1 3 2), (5 6 4 2 1 3), (5 6 4 1 2 3), (4 6 5 3 2 1), (4 6 5 3 1 2), (4 6 5 2 3 1), (4 6 5 1 3 2), (4 6 5 2 1 3), (4 6 5 1 2 3), (5 4 6 3 2 1), (5 4 6 3 1 2), (5 4 6 2 3 1), (5 4 6 1 3 2), (5 4 6 2 1 3), (5 4 6 1 2 3), (4 5 6 3 2 1), (4 5 6 3 1 2), (4 5 6 2 3 1), (4 5 6 1 3 2), (4 5 6 2 1 3), (4 5 6 1 2 3), (3 2 1 6 5 4), (3 1 2 6 5 4), (2 3 1 6 5 4), (1 3 2 6 5 4), (2 1 3 6 5 4), (1 2 3 6 5 4), (3 2 1 6 4 5), (3 1 2 6 4 5), (2 3 1 6 4 5), (1 3 2 6 4 5), (2 1 3 6 4 5), (1 2 3 6 4 5), (3 2 1 5 6 4), (3 1 2 5 6 4), (2 3 1 5 6 4), (1 3 2 5 6 4), (2 1 3 5 6 4), (1 2 3 5 6 4), (3 2 1 4 6 5), (3 1 2 4 6 5), (2 3 1 4 6 5), (1 3 2 4 6 5), (2 1 3 4 6 5), (1 2 3 4 6 5), (3 2 1 5 4 6), (3 1 2 5 4 6), (2 3 1 5 4 6), (1 3 2 5 4 6), (2 1 3 5 4 6), (1 2 3 5 4 6), (3 2 1 4 5 6), (3 1 2 4 5 6), (2 3 1 4 5 6), (1 3 2 4 5 6), (2 1 3 4 5 6), (1 2 3 4 5 6)

Invariant group of Orbit 3:

1. Group Size is 120.

2. Elements are : (5 4 3 2 1 6), (5 4 3 1 2 6), (5 4 2 3 1 6), (5 4 1 3 2 6), (5 4 2 1 3 6), (5 4 1 2 3 6), (5 3 4 2 1 6), (5 3 4 1 2 6), (5 2 4 3 1 6), (5 1 4 3 2 6), (5 2 4 1 3 6), (5 1 4 2 3 6), (5 3 2 4 1 6), (5 3 1 4 2 6), (5 2 3 4 1 6), (5 1 3 4 2 6), (5 2 1 4 3 6), (5 1 2 4 3 6), (5 3 2 1 4 6), (5 3 1 2 4 6), (5 2 3 1 4 6), (5 1 3 2 4 6), (5 2 1 3 4 6), (5 1 2 3 4 6), (4 5 3 2 1 6), (4 5 3 1 2 6), (4 5 2 3 1 6), (4 5 1 3 2 6), (4 5 2 1 3 6), (4 5 1 2 3 6), (3 5 4 2 1 6), (3 5 4 1 2 6), (2 5 4 3 1 6), (1 5 4 3 2 6), (2 5 4 1 3 6), (1 5 4 2 3 6), (3 5 2 4 1 6), (3 5 1 4 2 6), (2 5 3 4 1 6), (1 5 3 4 2 6), (2 5 1 4 3 6), (1 5 2 4 3 6), (3 5 2 1 4 6), (3 5 1 2 4 6), (2 5 3 1 4 6), (1 5 3 2 4 6), (2 5 1 3 4 6), (1 5 2 3 4 6), (4 3 5 2 1 6), (4 3 5 1 2 6), (4 2 5 3 1 6), (4 1 5 3 2 6), (4 2 5 1 3 6), (4 1 5 2 3 6), (3 4 5 2 1 6), (3 4 5 1 2 6), (2 4 5 3 1 6), (1 4 5 3 2 6), (2 4 5 1 3 6), (1 4 5 2 3 6), (3 2 5 4 1 6), (3 1 5 4 2 6), (2 3 5 4 1 6), (1 3 5 4 2 6), (2 1 5 4 3 6), (1 2 5 4 3 6), (3 2 5 1 4 6), (3 1 5 2 4 6), (2 3 5 1 4 6), (1 3 5 2 4 6), (2 1 5 3 4 6), (1 2 5 3 4 6), (4 3 2 5 1 6), (4 3 1 5 2 6), (4 2 3 5 1 6), (4 1 3 5 2 6), (4 2 1 5 3 6), (4 1 2 5 3 6), (3 4 2 5 1 6), (3 4 1 5 2 6), (2 4 3 5 1 6), (1 4 3 5 2 6), (2 4 1 5 3 6), (1 4 2 5 3 6), (3 2 4 5 1 6), (3 1 4 5 2 6), (2 3 4 5 1 6), (1 3 4 5 2 6), (2 1 4 5 3 6), (1 2 4 5 3 6), (3 2 1 5 4 6), (3 1 2 5 4 6), (2 3 1 5 4 6), (1 3 2 5 4 6), (2 1 3 5 4 6), (1 2 3 5 4 6), (4 3 2 1 5 6), (4 3 1 2 5 6), (4 2 3 1 5 6), (4 1 3 2 5 6), (4 2 1 3 5 6), (4 1 2 3 5 6), (3 4 2 1 5 6), (3 4 1 2 5 6), (2 4 3 1 5 6), (1 4 3 2 5 6), (2 4 1 3 5 6), (1 4 2 3 5 6), (3 2 4 1 5 6), (3 1 4 2 5 6), (2 3 4 1 5 6), (1 3 4 2 5 6), (2 1 4 3 5 6), (1 2 4 3 5 6), (3 2 1 4 5 6), (3 1 2 4 5 6), (2 3 1 4 5 6), (1 3 2 4 5 6), (2 1 3 4 5 6), (1 2 3 4 5 6)

2 The intrisic informations concerning the graph of facet rays of CUT6.ine

The graph considered is made of 210 elements.
The group acting on CUT6.ine is ReprS6
Under the group action we have in fact only 4 orbits to consider.
The diameter of the graph is 3.
The list of orbits is with adjacency and Size info:

F1:	-1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	98	60
F2:	-1	-1	0	1	1	-1	0	1	1	0	1	1	0	0	-1	54	60
F3:	-1	-1	1	1	2	-1	1	1	2	1	1	2	-1	-2	-2	14	60
F4:	-1	-1	-1	1	2	-1	-1	1	2	-1	1	2	1	2	-2	14	30

The representation matrix is:

	F1	F2	F3	F4	Adj.	Size
F1	45	39	9	5	98	60
F2	39	8	5	2	54	60
F3	9	5	0	0	14	60
F4	10	4	0	0	14	30
Size	60	60	60	30		210

2.1 The local graphs

The complemented local graph are:
We consider graph with cardinal inferior or equal to 20
The complemented local graph for orbit 3 is:

1 0 :
2 0 :
3 0 :
4 0 :
5 0 :
6 0 :
7 0 :
8 0 :
9 0 :
10 0 :
11 0 :
12 0 :
13 0 :
14 0 :

The complemented local graph for orbit 4 is:

1 0 :
2 0 :
3 0 :
4 0 :
5 0 :
6 0 :
7 0 :
8 0 :
9 0 :
10 0 :
11 0 :
12 0 :
13 0 :
14 0 :

2.2 scalar product between elements of orbits

This subsection made sense only if the representation is orthogonal which is the usual case Considering Orbit 1

1. Orbit Size is 60.
2. Norm of elements is 3.
3. Possible scalar product : -1, 0, 1

Considering Orbit 2

1. Orbit Size is 60.
2. Norm of elements is 10.
3. Possible scalar product : -2, 0, 2, 6

Considering Orbit 3

1. Orbit Size is 60.
2. Norm of elements is 30.
3. Possible scalar product : -10, -6, -4, 2, 26

Considering Orbit 4

1. Orbit Size is 30.
2. Norm of elements is 30.
3. Possible scalar product : -6, -4, 2, 26

2.3 invariant group of Orbits

The invariant group of x is the set of g such that $g(x) = x$ denoted by G_x.
If x and y are in the same orbit then the groups G_x and G_y are conjuguate.
For any element x we denote O_x its Orbit, we have $|O_x| \times |G_x| = |G|$ We print only nontrivial groups Invariant group of Orbit 1:

1. Group Size is 12.
2. Elements are : (2 1 5 4 3 6), (1 2 5 4 3 6), (2 1 5 3 4 6), (1 2 5 3 4 6), (2 1 4 5 3 6), (1 2 4 5 3 6), (2 1 3 5 4 6), (1 2 3 5 4 6), (2 1 4 3 5 6), (1 2 4 3 5 6), (2 1 3 4 5 6), (1 2 3 4 5 6)

Invariant group of Orbit 2:

1. Group Size is 12.
2. Elements are : (3 2 1 4 6 5), (3 1 2 4 6 5), (2 3 1 4 6 5), (1 3 2 4 6 5), (2 1 3 4 6 5), (1 2 3 4 6 5), (3 2 1 4 5 6), (3 1 2 4 5 6), (2 3 1 4 5 6), (1 3 2 4 5 6), (2 1 3 4 5 6), (1 2 3 4 5 6)

Invariant group of Orbit 3:

1. Group Size is 12.
2. Elements are : (3 2 1 5 4 6), (3 1 2 5 4 6), (2 3 1 5 4 6), (1 3 2 5 4 6), (2 1 3 5 4 6), (1 2 3 5 4 6), (3 2 1 4 5 6), (3 1 2 4 5 6), (2 3 1 4 5 6), (1 3 2 4 5 6), (2 1 3 4 5 6), (1 2 3 4 5 6)

Invariant group of Orbit 4:

1. Group Size is 24.
2. Elements are : (4 3 2 1 5 6), (4 3 1 2 5 6), (4 2 3 1 5 6), (4 1 3 2 5 6), (4 2 1 3 5 6), (4 1 2 3 5 6), (3 4 2 1 5 6), (3 4 1 2 5 6), (2 4 3 1 5 6), (1 4 3 2 5 6), (2 4 1 3 5 6), (1 4 2 3 5 6), (3 2 4 1 5 6), (3 1 4 2 5 6), (2 3 4 1 5 6), (1 3 4 2 5 6), (2 1 4 3 5 6), (1 2 4 3 5 6), (3 2 1 4 5 6), (3 1 2 4 5 6), (2 3 1 4 5 6), (1 3 2 4 5 6), (2 1 3 4 5 6), (1 2 3 4 5 6)

3 The two incidence matrix

Incidence between Orbit of Extreme rays and Orbits of Facets

	$F1$	$F2$	$F3$	$F4$	Inc
$E1$	44	36	36	8	124
$E2$	42	36	18	18	114
$E3$	50	40	20	20	130

Incidence between Orbits of Facets and Orbits of Extreme Rays

	$E1$	$E2$	$E3$	Inc
$F1$	11	7	5	23
$F2$	9	6	4	19
$F3$	9	3	2	14
$F4$	4	6	4	14