The Cone 3-P6

13th January 2002

1 The intrisic informations concerning the graph of extreme rays of 3-P6.ext

The graph considered is made of 65 elements.
The group acting on 3-P6.ext is ReprS6
Under the group action we have in fact only 2 orbits to consider.
The diameter of the graph is 2.
The list of orbits is with adjacency and Size info:

E1:	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	58	45
E2:	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	55	20

The representation matrix is:

	E1	E2	Adj.	Size
E1	42	16	58	45
E2	36	19	55	20
Size	45	20		65

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 45.
2. Norm of elements is 4.
3. Possible scalar product : 0, 1, 2

Considering Orbit 2

1. Orbit Size is 20.
2. Norm of elements is 3.
3. Possible scalar product : 0, 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 16.

2. Elements are : (4 3 2 1 6 5), (4 3 1 2 6 5), (3 4 2 1 6 5), (3 4 1 2 6 5), (2 1 4 3 6 5), (1 2 4 3 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), (3 4 2 1 5 6), (3 4 1 2 5 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 36.

2. Elements are : (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)

2 The intrisic informations concerning the graph of facet rays of 3-P6.ine

The graph considered is made of 4065 elements.
The group acting on 3-P6.ine is ReprS6
Under the group action we have in fact only 16 orbits to consider.
The diameter of the graph is 3.
The list of orbits is with adjacency and Size info:

F1:	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1526	15
F2:	-1	0	1	0	1	0	0	1	0	0	0	1	0	0	0	703	30
F3:	-1	0	1	0	1	0	1	0	1	1	2	1	0	0	-1	100	180
F4:	-1	0	1	0	1	0	1	0	1	1	1	2	-1	1	0	37	360
F5:	-1	-1	2	0	1	1	2	1	1	0	2	1	1	2	-2	31	360
F6:	-1	-1	2	1	0	2	1	2	0	2	2	1	1	-1	-1	30	180
F7:	-1	-1	2	1	0	2	2	1	1	-1	2	3	-1	1	0	23	360
F8:	-1	-2	3	1	2	1	2	1	2	-1	2	1	2	3	-2	23	360
F9:	-1	-2	3	2	1	2	2	1	2	-2	3	4	-1	1	1	23	180
F10:	-1	-1	2	-1	2	2	2	1	1	1	2	1	1	1	-2	22	60
F11:	-1	-1	2	0	1	1	1	2	2	-1	2	1	1	2	-1	18	360
F12:	-1	-1	2	1	1	1	1	1	1	-1	1	1	1	-1	2	18	90
F13:	-1	-1	2	1	0	2	1	2	0	0	2	1	1	-1	1	14	720
F14:	-1	0	1	0	1	2	2	1	0	2	2	1	2	0	-2	14	360
F15:	-1	-1	2	1	0	2	2	1	1	1	2	1	1	1	-2	14	360
F16:	-1	0	1	0	1	0	1	0	1	1	1	0	1	1	0	14	90

The representation matrix is:

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14	F15	F16	Adj.	Size
F1	14	28	144	144	192	96	120	168	36	20	120	36	240	72	72	24	1526	15
F2	14	25	72	96	60	24	72	48	36	10	48	12	72	48	48	18	703	30
F3	12	12	14	10	10	6	10	0	0	2	2	0	12	4	4	2	100	180
F4	6	8	5	2	2	2	2	2	2	0	2	0	0	2	2	0	37	360
F5	8	5	5	2	3	0	0	2	0	1	1	0	0	2	2	0	31	360
F6	8	4	6	4	0	2	4	2	0	0	0	0	0	0	0	0	30	180
F7	5	6	5	2	0	2	0	0	1	0	0	0	2	0	0	0	23	360
F8	7	4	0	2	2	1	0	0	2	0	2	1	2	0	0	0	23	360
F9	3	6	0	4	0	0	2	4	0	0	0	0	0	2	2	0	23	180
F10	5	5	6	0	6	0	0	0	0	0	0	0	0	0	0	0	22	60
F11	5	4	1	2	1	0	0	2	0	0	0	1	2	0	0	0	18	360
F12	6	4	0	0	0	0	0	4	0	0	4	0	0	0	0	0	18	90
F13	5	3	3	0	0	0	1	1	0	0	1	0	0	0	0	0	14	720
F14	3	4	2	2	2	0	0	0	1	0	0	0	0	0	0	0	14	360
F15	3	4	2	2	2	0	0	0	1	0	0	0	0	0	0	0	14	360
F16	4	6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	14	90
Size	15	30	180	360	360	180	360	360	180	60	360	90	720	360	360	90		4065

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 11 is:

1	0	:	
2	8	:	3 4 6 7 10 12 13 17
3	8	:	2 4 5 7 11 12 13 15
4	5	:	2 3 7 12 13
5	5	:	3 6 9 12 13
6	5	:	2 5 9 12 13
7	6	:	2 3 4 9 12 13
8	0	:	
9	3	:	5 6 7
10	1	:	2
11	1	:	3
12	7	:	2 3 4 5 6 7 13
13	7	:	2 3 4 5 6 7 12
14	0	:	
15	1	:	3
16	0	:	
17	1	:	2
18	0	:	

The complemented local graph for orbit 12 is:

1	0	:	
2	6	:	3 4 5 6 9 16
3	6	:	2 4 5 7 8 15
4	6	:	2 3 5 8 9 10
5	6	:	2 3 4 6 7 11
6	5	:	2 5 7 8 9
7	5	:	3 5 6 8 9
8	5	:	3 4 6 7 9
9	5	:	2 4 6 7 8
10	1	:	4
11	1	:	5
12	0	:	
13	0	:	
14	0	:	
15	1	:	3
16	1	:	2
17	0	:	
18	0	:	

The complemented local graph for orbit 13 is:

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

The complemented local graph for orbit 14 is:

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

The complemented local graph for orbit 15 is:

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

The complemented local graph for orbit 16 is:

1	1	:	7
2	1	:	3
3	1	:	2
4	0	:	
5	0	:	
6	0	:	
7	1	:	1
8	1	:	9
9	1	:	8
10	1	:	11
11	1	:	10
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 15.
2. Norm of elements is 1.
3. Possible scalar product : 0

Considering Orbit 2

1. Orbit Size is 30.
2. Norm of elements is 5.
3. Possible scalar product : -1, 1

Considering Orbit 3

1. Orbit Size is 180.

2. Norm of elements is 12.
3. Possible scalar product : $-4, 0, 4, 8$

Considering Orbit 4

1. Orbit Size is 360.
2. Norm of elements is 13.
3. Possible scalar product : $-3, -1, 1, 3, 5, 7, 9$

Considering Orbit 5

1. Orbit Size is 360.
2. Norm of elements is 28.
3. Possible scalar product : $-8, -6, -4, -2, 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 24$

Considering Orbit 6

1. Orbit Size is 180.
2. Norm of elements is 28.
3. Possible scalar product : $-8, -4, 0, 4, 8, 12, 16, 20, 24$

Considering Orbit 7

1. Orbit Size is 360.
2. Norm of elements is 33.
3. Possible scalar product : $-7, -5, -3, -1, 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 29$

Considering Orbit 8

1. Orbit Size is 360.
2. Norm of elements is 52.
3. Possible scalar product : $-12, -8, -4, 0, 4, 8, 12, 16, 20, 24, 28, 32, 36, 48$

Considering Orbit 9

1. Orbit Size is 180.
2. Norm of elements is 64.
3. Possible scalar product : $-8, 0, 8, 12, 16, 20, 24, 28, 32, 36, 44, 48$

Considering Orbit 10

1. Orbit Size is 60.
2. Norm of elements is 33.
3. Possible scalar product : $-3, -1, 5, 7, 9, 13, 21$

Considering Orbit 11

1. Orbit Size is 360.

2. Norm of elements is 29.

3. Possible scalar product : $-5, -3, -1, 1, 3, 5, 7, 9, 11, 13, 15, 17, 21, 25$

Considering Orbit 12

1. Orbit Size is 90.

2. Norm of elements is 21.

3. Possible scalar product : $-1, 2, 3, 5, 8, 11, 12$

Considering Orbit 13

1. Orbit Size is 720.

2. Norm of elements is 24.

3. Possible scalar product : $-6, -4, -2, 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20$

Considering Orbit 14

1. Orbit Size is 360.

2. Norm of elements is 29.

3. Possible scalar product : $-7, -5, -3, -1, 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 25$

Considering Orbit 15

1. Orbit Size is 360.

2. Norm of elements is 29.

3. Possible scalar product : $-7, -5, -3, -1, 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 25$

Considering Orbit 16

1. Orbit Size is 90.

2. Norm of elements is 9.

3. Possible scalar product : $1, 3, 5$

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 48.

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

Invariant group of Orbit 3:

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

Invariant group of Orbit 4:

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

Invariant group of Orbit 5:

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

Invariant group of Orbit 6:

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

Invariant group of Orbit 7:

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

Invariant group of Orbit 8:

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

Invariant group of Orbit 9:

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

Invariant group of Orbit 10:

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 11:

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

Invariant group of Orbit 12:

1. Group Size is 8.
2. Elements are : (5 4 6 2 1 3), (5 4 6 1 2 3), (4 5 6 2 1 3), (4 5 6 1 2 3), (2 1 3 5 4 6), (1 2 3 5 4 6), (2 1 3 4 5 6), (1 2 3 4 5 6)

Invariant group of Orbit 14:

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

Invariant group of Orbit 15:

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

Invariant group of Orbit 16:

1. Group Size is 8.
2. Elements are : (4 3 2 1 6 5), (4 3 1 2 6 5), (3 4 2 1 6 5), (3 4 1 2 6 5), (2 1 4 3 5 6), (1 2 4 3 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

	$F1$	$F2$	$F3$	$F4$	$F5$	$F6$	$F7$	$F8$	$F9$	$F10$	$F11$	$F12$	$F13$	$F14$	$F15$	$F16$	Inc
$E1$	11	18	60	96	96	48	80	104	44	16	88	28	144	72	72	16	993
$E2$	12	21	72	126	108	54	108	72	36	18	90	9	180	90	90	27	1113

Incidence between Orbits of Facets and Orbits of Extreme Rays

	$E1$	$E2$	Inc
$F1$	33	16	49
$F2$	27	14	41
$F3$	15	8	23
$F4$	12	7	19
$F5$	12	6	18
$F6$	12	6	18
$F7$	10	6	16
$F8$	13	4	17
$F9$	11	4	15
$F10$	12	6	18
$F11$	11	5	16
$F12$	14	2	16
$F13$	9	5	14
$F14$	9	5	14
$F15$	9	5	14
$F16$	8	6	14