The Cone QMET4

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1 The intrisic informations concerning the graph of extreme rays of QMET4.ext

The graph considered is made of 164 elements.
The group acting on QMET4.ext is ReprS4revers
Under the group action we have in fact only 10 orbits to consider.
The diameter of the graph is 3.
The list of orbits is with adjacency and Size info:

E1:	0	0	0	0	0	0	1	1	0	1	1	0	97	6
E2:	0	0	0	0	0	0	0	0	0	1	1	1	91	8
E3:	0	0	0	0	0	0	1	1	0	1	1	1	46	24
E4:	0	0	0	1	0	0	1	0	0	1	1	1	46	12
E5:	0	0	0	1	0	0	1	1	0	1	1	1	33	24
E6:	0	0	0	1	0	0	1	1	1	1	1	1	21	24
E7:	0	0	1	1	1	1	1	1	1	1	0	0	20	6
E8:	0	0	0	1	0	0	1	1	0	2	1	1	18	24
E9:	0	0	0	1	0	1	1	1	1	1	1	0	16	12
E10:	0	0	1	1	1	1	1	1	2	1	0	0	12	24

The representation matrix is:

	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	Adj.	Size
E1	5	8	20	12	8	16	4	12	4	8	97	6
E2	6	7	21	9	18	9	3	6	6	6	91	8
E3	5	7	7	5	10	4	0	4	2	2	46	24
E4	6	6	10	2	8	4	2	4	0	4	46	12
E5	2	6	10	4	3	2	0	4	1	1	33	24
E6	4	3	4	2	2	0	1	2	1	2	21	24
E7	4	4	0	4	0	4	0	0	0	4	20	6
E8	3	2	4	2	4	2	0	0	1	0	18	24
E9	2	4	4	0	2	2	0	2	0	0	16	12
E10	2	2	2	2	1	2	1	0	0	0	12	24
Size	6	8	24	12	24	24	6	24	12	24		164

1.1 The local graphs

The complemented local graph are:
We consider graph with cardinal inferior or equal to 20

The complemented local graph for orbit 7 is:

1	11	:	5 6 7 8 9 10 11 12 14 15 20
2	6	:	5 7 8 11 13 15
3	8	:	5 6 7 8 10 13 14 18
4	3	:	6 10 11
5	11	:	1 2 3 6 10 11 16 17 18 19 20
6	11	:	1 3 4 5 8 9 11 12 13 15 19
7	8	:	1 2 3 10 11 13 15 19
8	6	:	1 2 3 6 13 18
9	2	:	1 6
10	8	:	1 3 4 5 7 13 15 18
11	11	:	1 2 4 5 6 7 13 14 16 17 18
12	2	:	1 6
13	8	:	2 3 6 7 8 10 11 20
14	3	:	1 3 11
15	6	:	1 2 6 7 10 18
16	2	:	5 11
17	2	:	5 11
18	6	:	3 5 8 10 11 15
19	3	:	5 6 7
20	3	:	1 5 13

The complemented local graph for orbit 8 is:

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

The complemented local graph for orbit 9 is:

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

The complemented local graph for orbit 10 is:

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

1.2 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 6.
2. Norm of elements is 4.
3. Possible scalar product : 0, 1

Considering Orbit 2

1. Orbit Size is 8.
2. Norm of elements is 3.
3. Possible scalar product : 0, 1

Considering Orbit 3

1. Orbit Size is 24.

2. Norm of elements is 5.
3. Possible scalar product : 0, 1, 2, 3, 4

Considering Orbit 4

1. Orbit Size is 12.
2. Norm of elements is 5.
3. Possible scalar product : 0, 1, 2, 3

Considering Orbit 5

1. Orbit Size is 24.
2. Norm of elements is 6.
3. Possible scalar product : 0, 1, 2, 3, 4, 5

Considering Orbit 6

1. Orbit Size is 24.
2. Norm of elements is 7.
3. Possible scalar product : 2, 3, 4, 5, 6

Considering Orbit 7

1. Orbit Size is 6.
2. Norm of elements is 8.
3. Possible scalar product : 4, 5

Considering Orbit 8

1. Orbit Size is 24.
2. Norm of elements is 9.
3. Possible scalar product : 0, 1, 2, 3, 4, 5, 6, 7, 8

Considering Orbit 9

1. Orbit Size is 12.
2. Norm of elements is 7.
3. Possible scalar product : 2, 3, 4, 5

Considering Orbit 10

1. Orbit Size is 24.
2. Norm of elements is 11.
3. Possible scalar product : 4, 5, 6, 7, 8, 10

1.3 invariant group of Orbits

The invariant group of x is the set of g such that g(x)=x denoted b G_x.
If x and y are in the same orbit then the groups G_x and G_x are conjuguate.
Invariant group of Orbit 1

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

Invariant group of Orbit 2

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

Invariant group of Orbit 3

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

Invariant group of Orbit 4

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

Invariant group of Orbit 5

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

Invariant group of Orbit 6

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

Invariant group of Orbit 7

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

Invariant group of Orbit 8

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

Invariant group of Orbit 9

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

Invariant group of Orbit 10

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

2 The intrisic informations concerning the graph of facet rays of QMET4.ine

The graph considered is made of 36 elements.
The group acting on QMET4.ine is ReprS4revers
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:

F1:	-1	0	1	0	0	0	0	0	0	0	1	0	28	24
F2:	0	0	0	0	0	0	0	0	0	0	0	1	28	12

The representation matrix is:

	F1	F2	Adj.	Size
F1	17	11	28	24
F2	22	6	28	12
Size	24	12		36

No complemented local graph of size inferior to 20.

2.1 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 24.
2. Norm of elements is 3.
3. Possible scalar product : -2, -1, 0, 1

Considering Orbit 2

1. Orbit Size is 12.
2. Norm of elements is 1.
3. Possible scalar product : 0

2.2 invariant group of Orbits

The invariant group of x is the set of g such that g(x)=x denoted b G_x.
If x and y are in the same orbit then the groups G_x and G_x are conjuguate.
Invariant group of Orbit 1

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

Invariant group of Orbit 2

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

3 The two incidence matrix

Incidence between Orbit of Extreme rays and Orbits of Facets

	$F1$	$F2$	Inc
$E1$	16	8	24
$E2$	18	9	27
$E3$	14	7	21
$E4$	14	7	21
$E5$	12	6	18
$E6$	10	5	15
$E7$	8	4	12
$E8$	10	6	16
$E9$	10	5	15
$E10$	8	4	12

Incidence between Orbits of Facets and Orbits of Extreme Rays

	$E1$	$E2$	$E3$	$E4$	$E5$	$E6$	$E7$	$E8$	$E9$	$E10$	Inc
$F1$	4	6	14	7	12	10	2	10	5	8	78
$F2$	4	6	14	7	12	10	2	12	5	8	80