Facets of HYP_8

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Here is a list of 86 orbits of facets of the hypermetric cone HYP_8. This list was obtained by computing:

1. the affine basis of the Gosset polytope and of the new 7 dimensional extreme Delaunay polytope.

2. The corresponding extreme rays

3. the expression of the corresponding hypermetric vectors.

4. taking the closure by the switching classes.

Also, I added hypermetric facets of the cut cone CUT_8 (class 22). It is likely that the list is complete but any help in finding a missed one would be appreciated.

The data are organized by switching classes, with their major represent first.

1. Class 1: 1 orbit

0	0	0	0	0	1	1	1
−1	0	0	0	0	0	1	1

2. Class 2: 1 orbit

0	0	0	1	1	1	1	1
−1	−1	0	0	0	1	1	1

3. Class 3: 2 orbits

0	0	1	1	1	1	1	2
−2	−1	0	0	1	1	1	1
−1	−1	−1	0	0	1	1	2

4. Class 4: 1 orbit

0	1	1	1	1	1	1	1
−1	−1	−1	0	1	1	1	1

5. Class 5: 2 orbits

0	1	1	1	1	1	1	3
−3	−1	0	1	1	1	1	1
−1	−1	−1	−1	0	1	1	3

6. Class 6: 3 orbits

0	1	1	1	1	1	2	2
−2	−2	0	1	1	1	1	1
−2	−1	−1	0	1	1	1	2
−1	−1	−1	−1	0	1	2	2

7. Class 7: 4 orbits

0	1	1	1	1	2	2	3
−3	−2	0	1	1	1	1	2
−3	−1	−1	0	1	1	2	2
−2	−2	−1	0	1	1	1	3
−2	−1	−1	−1	0	1	2	3

8. Class 8: 2 orbits

1	1	1	1	1	1	1	2
−2	−1	−1	1	1	1	1	1
−1	−1	−1	−1	1	1	1	2

9. Class 9: 4 orbits

1	1	1	1	1	1	2	3
−3	−2	1	1	1	1	1	1
−3	−1	−1	1	1	1	1	2
−2	−1	−1	−1	1	1	1	3
−1	−1	−1	−1	−1	1	2	3

10. Class 10: 3 orbits

1	1	1	1	1	2	2	2
−2	−2	−1	1	1	1	1	2
−2	−1	−1	−1	1	1	2	2
−1	−1	−1	−1	−1	2	2	2

11. Class 11: 4 orbits

1	1	1	1	1	2	2	4
−4	−2	1	1	1	1	1	2
−4	−1	−1	1	1	1	2	2
−2	−2	−1	−1	1	1	1	4
−2	−1	−1	−1	−1	1	2	4

1	1	1	1	1	2	3	3
−3	−3	1	1	1	1	1	2
−3	−2	−1	1	1	1	1	3
−3	−1	−1	−1	1	1	2	3
−2	−1	−1	−1	−1	1	3	3

13. Class 13: 4 orbits

1	1	1	1	1	3	3	4
−4	−3	1	1	1	1	1	3
−4	−1	−1	−1	1	1	3	3
−3	−3	−1	1	1	1	1	4
−3	−1	−1	−1	−1	1	3	4

14. Class 14: 5 orbits

1	1	1	1	2	2	2	3
−3	−2	−1	1	1	1	2	2
−3	−1	−1	−1	1	2	2	2
−2	−2	−2	1	1	1	1	3
−2	−2	−1	−1	1	1	2	3
−2	−1	−1	−1	−1	2	2	3

15. Class 15: 4 orbits

1	1	1	1	2	2	2	5
−5	−2	1	1	1	1	2	2
−5	−1	−1	1	1	2	2	2
−2	−2	−2	−1	1	1	1	5
−2	−2	−1	−1	−1	1	2	5

16. Class 16: 7 orbits

1	1	1	1	2	2	3	4
−4	−3	1	1	1	1	2	2
−4	−2	−1	1	1	1	2	3
−4	−1	−1	−1	1	2	2	3
−3	−2	−2	1	1	1	1	4
−3	−2	−1	−1	1	1	2	4
−3	−1	−1	−1	−1	2	2	4
−2	−2	−1	−1	−1	1	3	4

17. Class 17: 6 orbits

1	1	1	1	2	3	3	5
−5	−3	1	1	1	1	2	3
−5	−2	−1	1	1	1	3	3
−5	−1	−1	−1	1	2	3	3
−3	−3	−2	1	1	1	1	5
−3	−3	−1	−1	1	1	2	5
−3	−2	−1	−1	−1	1	3	5

1	1	1	2	2	2	3	3
−3	−3	−1	1	1	2	2	2
−3	−2	−2	1	1	1	2	3
−3	−2	−1	−1	1	2	2	3
−2	−2	−2	−1	1	1	3	3
−2	−2	−1	−1	−1	2	3	3

19. Class 19: 7 orbits

1	1	1	2	2	3	3	4
−4	−3	−1	1	1	2	2	3
−4	−2	−2	1	1	1	3	3
−4	−2	−1	−1	1	2	3	3
−3	−3	−2	1	1	1	2	4
−3	−3	−1	−1	1	2	2	4
−3	−2	−2	−1	1	1	3	4
−3	−2	−1	−1	−1	2	3	4

20. Class 20: 9 orbits

1	1	1	2	2	3	4	5
−5	−4	1	1	1	2	2	3
−5	−3	−1	1	1	2	2	4
−5	−2	−2	1	1	1	3	4
−5	−2	−1	−1	1	2	3	4
−4	−3	−2	1	1	1	2	5
−4	−3	−1	−1	1	2	2	5
−4	−2	−2	−1	1	1	3	5
−4	−2	−1	−1	−1	2	3	5
−3	−2	−2	−1	−1	1	4	5

21. Class 21: 6 orbits

1	1	2	2	2	3	3	5
−5	−3	−1	1	2	2	2	3
−5	−2	−2	1	1	2	3	3
−5	−2	−1	−1	2	2	3	3
−3	−3	−2	−1	1	2	2	5
−3	−2	−2	−2	1	1	3	5
−3	−2	−2	−1	−1	2	3	5

22. Class 22: 2 orbits (this one does not appear in Gosset or New Extreme Delaunay but only from CUT_8)

1	1	1	1	1	1	1	4
−4	−1	1	1	1	1	1	1
−1	−1	−1	−1	−1	1	1	4