Number of vertices $n = 9$.
Adjacencies of Graph

1. vertex 1 adjacent to 2 3 4 5 6 7 8 9
2. vertex 2 adjacent to 1 3 4 5 6 7 8 9
3. vertex 3 adjacent to 1 2 5 6 7 8 9
4. vertex 4 adjacent to 1 2 5 6 7 8 9
5. vertex 5 adjacent to 1 2 3 4
6. vertex 6 adjacent to 1 2 3 4
7. vertex 7 adjacent to 1 2 3 4
8. vertex 8 adjacent to 1 2 3 4
9. vertex 9 adjacent to 1 2 3 4

Size of automorphism group of the graph=480
Full group: $|Aut(polytope)| = 122880$
Restricted group: $|Aut(G) \times switch| = 122880$
Number of orbits for the full group : 7
List of orbits of facets for the full group: Total number of orbits = 7 Total number of facets = 5308

1. Inequality 1 with incidence 192 and stabilizer of size 6144. Orbit size is 20 nature: 3-cycle inequality, C=[ 2, 5, 1 ] F=[ 2, 5 ]

| | | | | | |
|---|---|---|---|---|---|
| (1,2) : 1 | (1,3) : 0 | (1,4) : 0 | (1,5) : 1 | (1,6) : 0 | (1,7) : 0 |
| (1,8) : 0 | (1,9) : 0 | (2,3) : 0 | (2,4) : 0 | (2,5) : -1 | (2,6) : 0 |
| (2,7) : 0 | (2,8) : 0 | (2,9) : 0 | (3,5) : 0 | (3,6) : 0 | (3,7) : 0 |
| (3,8) : 0 | (3,9) : 0 | (4,5) : 0 | (4,6) : 0 | (4,7) : 0 | (4,8) : 0 |
| (4,9) : 0 | | | | | |

2. Inequality 2 with incidence 192 and stabilizer of size 1536. Orbit size is 80 nature: 3-cycle inequality, C=[ 1, 4, 7 ] F=[ 1, 4 ]

| | | | | | |
|---|---|---|---|---|---|
| (1,2) : 0 | (1,3) : 0 | (1,4) : -1 | (1,5) : 0 | (1,6) : 0 | (1,7) : 1 |
| (1,8) : 0 | (1,9) : 0 | (2,3) : 0 | (2,4) : 0 | (2,5) : 0 | (2,6) : 0 |
| (2,7) : 0 | (2,8) : 0 | (2,9) : 0 | (3,5) : 0 | (3,6) : 0 | (3,7) : 0 |
| (3,8) : 0 | (3,9) : 0 | (4,5) : 0 | (4,6) : 0 | (4,7) : 1 | (4,8) : 0 |
| (4,9) : 0 | | | | | |

3. Inequality 3 with incidence 192 and stabilizer of size 15360. Orbit size is 8 nature: 3-cycle inequality, C=[ 2, 4, 1 ] F=[ 2, 4 ]

| | | | | | |
|---|---|---|---|---|---|
| (1,2) : 1 | (1,3) : 0 | (1,4) : 1 | (1,5) : 0 | (1,6) : 0 | (1,7) : 0 |
| (1,8) : 0 | (1,9) : 0 | (2,3) : 0 | (2,4) : -1 | (2,5) : 0 | (2,6) : 0 |
| (2,7) : 0 | (2,8) : 0 | (2,9) : 0 | (3,5) : 0 | (3,6) : 0 | (3,7) : 0 |
| (3,8) : 0 | (3,9) : 0 | (4,5) : 0 | (4,6) : 0 | (4,7) : 0 | (4,8) : 0 |
| (4,9) : 0 | | | | | |

4. Inequality 4 with incidence 128 and stabilizer of size 1536. Orbit size is 80 nature: 4-cycle inequality, C=[ 4, 8, 3, 6 ] F=[ 4, 8 ]

| | | | | | |
|---|---|---|---|---|---|
| (1,2) : 0 | (1,3) : 0 | (1,4) : 0 | (1,5) : 0 | (1,6) : 0 | (1,7) : 0 |
| (1,8) : 0 | (1,9) : 0 | (2,3) : 0 | (2,4) : 0 | (2,5) : 0 | (2,6) : 0 |
| (2,7) : 0 | (2,8) : 0 | (2,9) : 0 | (3,5) : 0 | (3,6) : 1 | (3,7) : 0 |
| (3,8) : 1 | (3,9) : 0 | (4,5) : 0 | (4,6) : 1 | (4,7) : 0 | (4,8) : -1 |
| (4,9) : 0 | | | | | |

5. Inequality 5 with incidence 112 and stabilizer of size 192. Orbit size is 640 nature: unknown

| | | | | | |
|---|---|---|---|---|---|
| (1,2) : 1 | (1,3) : 0 | (1,4) : -1 | (1,5) : 0 | (1,6) : 0 | (1,7) : 1 |
| (1,8) : 0 | (1,9) : 1 | (2,3) : 0 | (2,4) : 1 | (2,5) : 0 | (2,6) : 0 |
| (2,7) : -1 | (2,8) : 0 | (2,9) : -1 | (3,5) : 0 | (3,6) : 0 | (3,7) : -1 |
| (3,8) : 0 | (3,9) : 1 | (4,5) : 0 | (4,6) : 0 | (4,7) : 1 | (4,8) : 0 |
| (4,9) : 1 | | | | | |

6. Inequality 6 with incidence 112 and stabilizer of size 192. Orbit size is 640 nature: unknown

| | | | | | |
|---|---|---|---|---|---|
| (1,2) : 1 | (1,3) : -1 | (1,4) : 1 | (1,5) : 1 | (1,6) : 0 | (1,7) : 0 |
| (1,8) : 0 | (1,9) : 0 | (2,3) : 1 | (2,4) : -1 | (2,5) : -1 | (2,6) : 0 |
| (2,7) : 0 | (2,8) : 0 | (2,9) : 0 | (3,5) : 1 | (3,6) : 0 | (3,7) : 0 |
| (3,8) : 0 | (3,9) : 1 | (4,5) : -1 | (4,6) : 0 | (4,7) : 0 | (4,8) : 0 |
| (4,9) : 1 | | | | | |

7. Inequality 7 with incidence 80 and stabilizer of size 32. Orbit size is 3840 nature: unknown

| | | | | | |
|---|---|---|---|---|---|
| (1,2) : 0 | (1,3) : 0 | (1,4) : 0 | (1,5) : 0 | (1,6) : -1 | (1,7) : 0 |
| (1,8) : 0 | (1,9) : 1 | (2,3) : 1 | (2,4) : 1 | (2,5) : 0 | (2,6) : -1 |
| (2,7) : 0 | (2,8) : 0 | (2,9) : -1 | (3,5) : 0 | (3,6) : 1 | (3,7) : 0 |
| (3,8) : 1 | (3,9) : 1 | (4,5) : 0 | (4,6) : 1 | (4,7) : 0 | (4,8) : -1 |
| (4,9) : 1 | | | | | |