部分群の計算法

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要約

与えられた有限群について，すべての部分群を求める方法を示す。まず，4次交代群，4次対称群，5次対称群，6次対称群について，すべての部分群を求め，これらを共役類で分類する。これらの部分群のいくつかについては，交換子群を求めることによって，可解であるかどうかを調べる。さらに，与えられた有限群が代数方程式のガロア群である場合に，すべての部分群を求めるところをすべての正規部分群を求めるように変更することにより，ガロア群の組成列を求める。

1. 部分群の計算法

与えられた有限群について，すべての部分群を求める方法を示す。

≪計算の準備≫
与えられた有限群を$G=\{\sigma_1, \sigma_2, \cdots, \sigma_N\}$ (Nは位数) とする。各元は数字$1, 2, \cdots, n$の置換として扱い，これを$j_1, j_2, \cdots, j_n$に移す置換を$\{j_1, j_2, \cdots, j_n\}$と表記する。各元は$j_1$の小さい順に，$j_1$が同じならば$j_2$の小さい順に，$j_1, j_2$が同じならば$j_3$の小さい順に，そして$j_1, j_2, \cdots, j_{n-2}$が同じならば$j_{n-1}$の小さい順に並べるものとする。

(例) 4次交代群の場合
この場合は$n=4$，$N=12$で，Gは以下のように表される。

$$G=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}\}$$
$$=\{\{1,2,3,4\}, \{1,3,4,2\}, \{1,4,2,3\}, \{2,1,4,3\}, \{2,3,1,4\}, \{2,4,3,1\},$$
$$\{3,1,2,4\}, \{3,2,4,1\}, \{3,4,1,2\}, \{4,1,3,2\}, \{4,2,1,3\}, \{4,3,2,1\}\}$$

まず，Gの各元について乗積表と逆元を求める。

(例) 4次交代群の場合
以下に$\sigma_i\sigma_j$の乗積表を示す。例えば，$\sigma_4=\{2,1,4,3\}$と$\sigma_9=\{3,4,1,2\}$の積は$\sigma_{12}=\{4,3,2,1\}$である。

$i \diagdown j$	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	3	1	7	9	8	10	12	11	4	5	6
3	3	1	2	10	11	12	4	6	5	7	9	8
4	4	6	5	1	3	2	11	10	12	8	7	9
5	5	4	6	8	7	9	1	2	3	11	12	10
6	6	5	4	11	12	10	8	9	7	1	3	2
7	7	8	9	2	1	3	5	4	6	12	10	11
8	8	9	7	5	6	4	12	11	10	2	1	3
9	9	7	8	12	10	11	2	3	1	5	6	4
10	10	12	11	3	2	1	9	7	8	6	4	5
11	11	10	12	6	4	5	3	1	2	9	8	7
12	12	11	10	9	8	7	6	5	4	3	2	1

以下にσ_iの逆元σ_jを示す。例えば，$\sigma_6=\{2,4,3,1\}$の逆元は$\sigma_{10}=\{4,1,3,2\}$である。

i	1	2	3	4	5	6	7	8	9	10	11	12
j	1	3	2	4	7	10	5	11	9	6	8	12

≪部分群の計算≫

以下の手順により，すべての部分群を求める。

(1)1個の元から生成される部分群を求める。これには，各元から生成される部分群を求め，その中から相異なるものを取り出す。

(2)2個の元から生成される部分群を求める。これには，1個の元から生成される部分群のうちの2つを組み合わせて新しい部分群を生成し，その中から既存でないものを取り出す。

(3)k=3, 4, 5, …として，k個の元から生成される部分群を求める。これには，k−1個の元から生成される部分群と1個の元から生成される部分群を組み合わせて新しい部分群を生成し，その中から既存でないものを取り出す。k個の元から生成される部分群がなければ終了とする。

以下に示すのは，Cプログラム風に書いたアルゴリズムである。

c：Gの部分群を数えるための変数

$H[c]$：Gのc番目の部分群，$H[1:c]$：$\{H[1], H[2], \cdots, H[c]\}$をまとめたもの

$h[c]$：$H[c]$の生成元，$h[1:c]$：$\{h[1], h[2], \cdots, h[c]\}$をまとめたもの

$t[k]$：k個の元から生成される部分群の最後尾の番号

手順(1)のアルゴリズムを示す。1個の元$\{\sigma_i\}$から生成される部分群$\langle\sigma_i\rangle$を求める。これが新規の部分群ならば，これを$h[c], H[c]$に代入する。

```
c=0;
for(i=1; i<=N; i++){
  if(<σi>∈H[1:c]) continue;
  c++; h[c]={σi}; H[c]=<σi>;
}
t[1]=c;
```

手順(2)のアルゴリズムを示す。1個の元$h[i]$から生成される部分群$H[i]$と，同じく1個の元$h[j]$から生成される部分群$H[j]$を合成することによって，2個の元$h[i]\cup h[j]$から生成される部分群$\langle H[i], H[j]\rangle$を求める。これが新規の部分群ならば，これを$h[c], H[c]$に代入する。2個の元から生成される部分群が1つもなければ($t[2]=t[1]$)，これで計算を終了する。

```
for(i=2; i<=t[1]-1; i++){
  for(j=i+1; j<=t[1]; j++){
    if(<H[i],H[j]>∈H[1:c]) continue;
    c++; h[c]=h[i]∪h[j]; H[c]=<H[i],H[j]>;
  }
}
t[2]=c;
```

手順(3)のアルゴリズムを示す。k=3, 4, 5, …として，k−1個の元$h[i]$から生成される部分群$H[i]$と，1個の元$h[j]$から生成される部分群$H[j]$を合成することによって，k個の元$h[i]\cup h[j]$から生成される部分群$\langle H[i], H[j]\rangle$を求める。これが新規の部分群ならば，これを$h[c], H[c]$に代入する。$k$個の元から生成される部分群が1つもなければ($t[k]=t[k-1]$)，これで計算を終了する。

```
for(k=3; t[k-1]>t[k-2]; k++){
  for(i=t[k-2]+1; i<=t[k-1]; i++){
    for(j=2; j<=t[1]; j++){
      if(max(h[i])>=h[j]) continue;
      if(<H[i],H[j]>∈H[1:c]) continue;
      c++; h[c]=h[i]∪h[j]; H[c]=<H[i],H[j]>;
    }
  }
  t[k]=c;
}
```

(例) 4次交代群の場合

1個の元から生成される部分群は以下の8個である。

$H_1=\langle\sigma_1\rangle=\{\sigma_1\}$: 単位群, 位数1

$H_2=\langle\sigma_2\rangle=\{\sigma_1, \sigma_2, \sigma_3\}$: (2, 3, 4)の偶置換, 位数3

$H_3=\langle\sigma_4\rangle=\{\sigma_1, \sigma_4\}$: (1, 2)の置換と(3, 4)の置換を同時に行ったもの, 位数2

$H_4=\langle\sigma_5\rangle=\{\sigma_1, \sigma_5, \sigma_7\}$: (1, 2, 3)の偶置換, 位数3

$H_5=\langle\sigma_6\rangle=\{\sigma_1, \sigma_6, \sigma_{10}\}$: (1, 2, 4)の偶置換, 位数3

$H_6=\langle\sigma_8\rangle=\{\sigma_1, \sigma_8, \sigma_{11}\}$: (1, 3, 4)の偶置換, 位数3

$H_7=\langle\sigma_9\rangle=\{\sigma_1, \sigma_9\}$: (1, 3)の置換と(2, 4)の置換を同時に行ったもの, 位数2

$H_8=\langle\sigma_{12}\rangle=\{\sigma_1, \sigma_{12}\}$: (1, 4)の置換と(2, 3)の置換を同時に行ったもの, 位数2

2個の元から生成される部分群は以下の2個である。

$H_9=\langle\sigma_2, \sigma_4\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}\}$: (1, 2, 3, 4)の偶置換, 位数12

$H_{10}=\langle\sigma_4, \sigma_9\rangle=\{\sigma_1, \sigma_4, \sigma_9, \sigma_{12}\}$: {{1, 2, 3, 4}, {2, 1, 4, 3}, {3, 4, 1, 2}, {4, 3, 2, 1}}, 位数4

3個の元から生成される部分群はない。以上より4次交代群の部分群は10個である。

≪共役類の計算≫

Gの部分群Hに対して, $gHg^{-1}(g\in G)$で表される部分群をHの共役類という。Gの部分群は共役類で分類することができる。以下に示すのは, k番目の部分群$H[k]$の共役類を求め, その番号を配列Sに代入するアルゴリズムである。sortは番号の小さい順に並べ替える関数である。

```
S={};
for(i=1; i<=N; i++){
  T=σ_i H[k] σ_i^{-1};
  T=sort(T);
  for(j=1; j<=c; j++){
    if(H[j]==T) break;
  }
  if(j∉S) S=S∪j;
}
S=sort(S);
```

（例）4次交代群の場合
以下の5種の共役類に分類できる。

$\{H_1\}$, $\{H_2, H_4, H_5, H_6\}$, $\{H_3, H_7, H_8\}$, $\{H_9\}$, $\{H_{10}\}$

4次交代群の部分群を共役類で分類して下表に示す。

位数	部分群
1	$H_1=\langle\sigma_1\rangle=\{\sigma_1\}$
2	$H_3=\langle\sigma_4\rangle=\{\sigma_1, \sigma_4\}$, $H_7=\langle\sigma_9\rangle=\{\sigma_1, \sigma_9\}$, $H_8=\langle\sigma_{12}\rangle=\{\sigma_1, \sigma_{12}\}$
3	$H_2=\langle\sigma_2\rangle=\{\sigma_1, \sigma_2, \sigma_3\}$, $H_4=\langle\sigma_5\rangle=\{\sigma_1, \sigma_5, \sigma_7\}$, $H_5=\langle\sigma_6\rangle=\{\sigma_1, \sigma_6, \sigma_{10}\}$, $H_6=\langle\sigma_8\rangle=\{\sigma_1, \sigma_8, \sigma_{11}\}$
4	$H_{10}=\langle\sigma_4, \sigma_9\rangle=\{\sigma_1, \sigma_4, \sigma_9, \sigma_{12}\}$
12	$H_9=\langle\sigma_2, \sigma_4\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}\}$

2. 4次対称群の部分群

この場合はn=4, N=24で, Gは以下のように表される。

$$G=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}, \sigma_{16}, \sigma_{17}, \sigma_{18}, \sigma_{19}, \sigma_{20}, \sigma_{21}, \sigma_{22}, \sigma_{23}, \sigma_{24}\}$$
$$=\{\{1,2,3,4\}, \{1,2,4,3\}, \{1,3,2,4\}, \{1,3,4,2\}, \{1,4,2,3\}, \{1,4,3,2\},$$
$$\{2,1,3,4\}, \{2,1,4,3\}, \{2,3,1,4\}, \{2,3,4,1\}, \{2,4,1,3\}, \{2,4,3,1\},$$
$$\{3,1,2,4\}, \{3,1,4,2\}, \{3,2,1,4\}, \{3,2,4,1\}, \{3,4,1,2\}, \{3,4,2,1\},$$
$$\{4,1,2,3\}, \{4,1,3,2\}, \{4,2,1,3\}, \{4,2,3,1\}, \{4,3,1,2\}, \{4,3,2,1\}\}$$

1個の元から生成される部分群は以下の17個である。

$H_1=\langle\sigma_1\rangle=\{\sigma_1\}$: 単位群, 位数1
$H_2=\langle\sigma_2\rangle=\{\sigma_1, \sigma_2\}$: (3, 4)の置換, 位数2
$H_3=\langle\sigma_3\rangle=\{\sigma_1, \sigma_3\}$: (2, 3)の置換, 位数2
$H_4=\langle\sigma_4\rangle=\{\sigma_1, \sigma_4, \sigma_5\}$: (2, 3, 4)の偶置換, 位数3
$H_5=\langle\sigma_6\rangle=\{\sigma_1, \sigma_6\}$: (2, 4)の置換, 位数2
$H_6=\langle\sigma_7\rangle=\{\sigma_1, \sigma_7\}$: (1, 2)の置換, 位数2
$H_7=\langle\sigma_8\rangle=\{\sigma_1, \sigma_8\}$: (1, 2)の置換と(3, 4)の置換を同時に行ったもの, 位数2
$H_8=\langle\sigma_9\rangle=\{\sigma_1, \sigma_9, \sigma_{13}\}$: (1, 2, 3)の偶置換, 位数3
$H_9=\langle\sigma_{10}\rangle=\{\sigma_1, \sigma_{10}, \sigma_{17}, \sigma_{19}\}$: (1, 2, 3, 4)の巡回置換, 位数4
$H_{10}=\langle\sigma_{11}\rangle=\{\sigma_1, \sigma_{11}, \sigma_{14}, \sigma_{24}\}$: (1, 2, 4, 3)の巡回置換, 位数4
$H_{11}=\langle\sigma_{12}\rangle=\{\sigma_1, \sigma_{12}, \sigma_{20}\}$: (1, 2, 4)の偶置換, 位数3
$H_{12}=\langle\sigma_{15}\rangle=\{\sigma_1, \sigma_{15}\}$: (1, 3)の置換, 位数2
$H_{13}=\langle\sigma_{16}\rangle=\{\sigma_1, \sigma_{16}, \sigma_{21}\}$: (1, 3, 4)の偶置換, 位数3
$H_{14}=\langle\sigma_{17}\rangle=\{\sigma_1, \sigma_{17}\}$: (1, 3)の置換と(2, 4)の置換を同時に行ったもの, 位数2
$H_{15}=\langle\sigma_{18}\rangle=\{\sigma_1, \sigma_8, \sigma_{18}, \sigma_{23}\}$: (1, 3, 2, 4)の巡回置換, 位数4
$H_{16}=\langle\sigma_{22}\rangle=\{\sigma_1, \sigma_{22}\}$: (1, 4)の置換, 位数2
$H_{17}=\langle\sigma_{24}\rangle=\{\sigma_1, \sigma_{24}\}$: (1, 4)の置換と(2, 3)の置換を同時に行ったもの, 位数2

2個の元から生成される部分群は以下の13個である。

$H_{18}=\langle\sigma_2, \sigma_3\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6\}$: (2, 3, 4)の全置換, 位数6
$H_{19}=\langle\sigma_2, \sigma_7\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8\}$: (1, 2)の置換と(3, 4)の置換の積, 位数4
$H_{20}=\langle\sigma_2, \sigma_9\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}, \sigma_{16}, \sigma_{17}, \sigma_{18}, \sigma_{19}, \sigma_{20}, \sigma_{21}, \cdots, \sigma_{24}\}$:
(1, 2, 3, 4)の全置換, 位数24
$H_{21}=\langle\sigma_2, \sigma_{15}\rangle=\{\sigma_1, \sigma_2, \sigma_{15}, \sigma_{16}, \sigma_{21}, \sigma_{22}\}$: (1, 3, 4)の全置換, 位数6
$H_{22}=\langle\sigma_2, \sigma_{17}\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8, \sigma_{17}, \sigma_{18}, \sigma_{23}, \sigma_{24}\}$: (1, 3, 2, 4)の巡回置換と(3, 4)の置換の積, 位数8
$H_{23}=\langle\sigma_3, \sigma_7\rangle=\{\sigma_1, \sigma_3, \sigma_7, \sigma_9, \sigma_{13}, \sigma_{15}\}$: (1, 2, 3)の全置換, 位数6
$H_{24}=\langle\sigma_3, \sigma_8\rangle=\{\sigma_1, \sigma_3, \sigma_8, \sigma_{11}, \sigma_{14}, \sigma_{17}, \sigma_{22}, \sigma_{24}\}$: (1, 2, 4, 3)の巡回置換と(2, 3)の置換の積, 位数8
$H_{25}=\langle\sigma_3, \sigma_{22}\rangle=\{\sigma_1, \sigma_3, \sigma_{22}, \sigma_{24}\}$: (1, 4)の置換と(2, 3)の置換の積, 位数4
$H_{26}=\langle\sigma_4, \sigma_8\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_8, \sigma_9, \sigma_{12}, \sigma_{13}, \sigma_{16}, \sigma_{17}, \sigma_{20}, \sigma_{21}, \sigma_{24}\}$: (1, 2, 3, 4)の偶置換, 位数12
$H_{27}=\langle\sigma_6, \sigma_7\rangle=\{\sigma_1, \sigma_6, \sigma_7, \sigma_{12}, \sigma_{20}, \sigma_{22}\}$: (1, 2, 4)の全置換, 位数6
$H_{28}=\langle\sigma_6, \sigma_8\rangle=\{\sigma_1, \sigma_6, \sigma_8, \sigma_{10}, \sigma_{15}, \sigma_{17}, \sigma_{19}, \sigma_{24}\}$: (1, 2, 3, 4)の巡回置換と(2, 4)の置換の積, 位数8
$H_{29}=\langle\sigma_6, \sigma_{15}\rangle=\{\sigma_1, \sigma_6, \sigma_{15}, \sigma_{17}\}$: (1, 3)の置換と(2, 4)の置換の積, 位数4
$H_{30}=\langle\sigma_8, \sigma_{17}\rangle=\{\sigma_1, \sigma_8, \sigma_{17}, \sigma_{24}\}$: $\{\{1,2,3,4\}, \{2,1,4,3\}, \{3,4,1,2\}, \{4,3,2,1\}\}$, 位数4

3個の元から生成される部分群はない。以上より4次対称群の部分群は30個である。4次対称群の部分群を共役類で分類して下表に示す。これは参考文献(1)の2頁の表と一致する。

位数	部分群
1	$H_1=\langle\sigma_1\rangle=\{\sigma_1\}$
2	$H_2=\langle\sigma_2\rangle=\{\sigma_1, \sigma_2\}$, $H_3=\langle\sigma_3\rangle=\{\sigma_1, \sigma_3\}$, $H_5=\langle\sigma_6\rangle=\{\sigma_1, \sigma_6\}$, $H_6=\langle\sigma_7\rangle=\{\sigma_1, \sigma_7\}$, $H_{12}=\langle\sigma_{15}\rangle=\{\sigma_1, \sigma_{15}\}$, $H_{16}=\langle\sigma_{22}\rangle=\{\sigma_1, \sigma_{22}\}$
	$H_7=\langle\sigma_8\rangle=\{\sigma_1, \sigma_8\}$, $H_{14}=\langle\sigma_{17}\rangle=\{\sigma_1, \sigma_{17}\}$, $H_{17}=\langle\sigma_{24}\rangle=\{\sigma_1, \sigma_{24}\}$
3	$H_4=\langle\sigma_4\rangle=\{\sigma_1, \sigma_4, \sigma_5\}$, $H_8=\langle\sigma_9\rangle=\{\sigma_1, \sigma_9, \sigma_{13}\}$, $H_{11}=\langle\sigma_{12}\rangle=\{\sigma_1, \sigma_{12}, \sigma_{20}\}$, $H_{13}=\langle\sigma_{16}\rangle=\{\sigma_1, \sigma_{16}, \sigma_{21}\}$
4	$H_9=\langle\sigma_{10}\rangle=\{\sigma_1, \sigma_{10}, \sigma_{17}, \sigma_{19}\}$, $H_{10}=\langle\sigma_{11}\rangle=\{\sigma_1, \sigma_{11}, \sigma_{14}, \sigma_{24}\}$, $H_{15}=\langle\sigma_{18}\rangle=\{\sigma_1, \sigma_8, \sigma_{18}, \sigma_{23}\}$
	$H_{19}=\langle\sigma_2, \sigma_7\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8\}$, $H_{25}=\langle\sigma_3, \sigma_{22}\rangle=\{\sigma_1, \sigma_3, \sigma_{22}, \sigma_{24}\}$, $H_{29}=\langle\sigma_6, \sigma_{15}\rangle=\{\sigma_1, \sigma_6, \sigma_{15}, \sigma_{17}\}$
	$H_{30}=\langle\sigma_8, \sigma_{17}\rangle=\{\sigma_1, \sigma_8, \sigma_{17}, \sigma_{24}\}$
6	$H_{18}=\langle\sigma_2, \sigma_3\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6\}$, $H_{21}=\langle\sigma_2, \sigma_{15}\rangle=\{\sigma_1, \sigma_2, \sigma_{15}, \sigma_{16}, \sigma_{21}, \sigma_{22}\}$, $H_{23}=\langle\sigma_3, \sigma_7\rangle=\{\sigma_1, \sigma_3, \sigma_7, \sigma_9, \sigma_{13}, \sigma_{15}\}$, $H_{27}=\langle\sigma_6, \sigma_7\rangle=\{\sigma_1, \sigma_6, \sigma_7, \sigma_{12}, \sigma_{20}, \sigma_{22}\}$
8	$H_{22}=\langle\sigma_2, \sigma_{17}\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8, \sigma_{17}, \sigma_{18}, \sigma_{23}, \sigma_{24}\}$, $H_{24}=\langle\sigma_3, \sigma_8\rangle=\{\sigma_1, \sigma_3, \sigma_8, \sigma_{11}, \sigma_{14}, \sigma_{17}, \sigma_{22}, \sigma_{24}\}$, $H_{28}=\langle\sigma_6, \sigma_8\rangle=\{\sigma_1, \sigma_6, \sigma_8, \sigma_{10}, \sigma_{15}, \sigma_{17}, \sigma_{19}, \sigma_{24}\}$
12	$H_{26}=\langle\sigma_4, \sigma_8\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_8, \sigma_9, \sigma_{12}, \sigma_{13}, \sigma_{16}, \sigma_{17}, \sigma_{20}, \sigma_{21}, \sigma_{24}\}$
24	$H_{20}=\langle\sigma_2, \sigma_9\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}, \sigma_{16}, \sigma_{17}, \sigma_{18}, \cdots, \sigma_{24}\}$

3. 5次対称群の部分群

この場合はn=5, N=120で, Gは以下のように表される。(途中は省略)

$$G=\{\sigma_1, \cdots, \sigma_{25}, \cdots, \sigma_{49}, \cdots, \sigma_{73}, \cdots, \sigma_{97}, \cdots, \sigma_{120}\}$$
$$=\{\{1,2,3,4,5\}, \cdots, \{2,1,3,4,5\}, \cdots, \{3,1,2,4,5\}, \cdots, \{4,1,2,3,5\}, \cdots, \{5,1,2,3,4\}, \cdots, \{5,4,3,2,1\}\}$$

1個の元から生成される部分群は以下の67個である。ただし, 同一の共役類に属する部分群は, 代表の1個(最初に見つかったもの)だけを示す。

$H_1=\langle\sigma_1\rangle=\{\sigma_1\}$: 単位群, 位数1

$H_2=\langle\sigma_2\rangle=\{\sigma_1, \sigma_2\}$: (4, 5)の置換, 位数2, 共役類は計10個

$H_4=\langle\sigma_4\rangle=\{\sigma_1, \sigma_4, \sigma_5\}$: (3, 4, 5)の偶置換, 位数3, 共役類は計10個

$H_7=\langle\sigma_8\rangle=\{\sigma_1, \sigma_8\}$: (2, 3)の置換と(4, 5)の置換を同時に行ったもの, 位数2, 共役類は計15個

$H_9=\langle\sigma_{10}\rangle=\{\sigma_1, \sigma_{10}, \sigma_{17}, \sigma_{19}\}$: (2, 3, 4, 5)の巡回置換, 位数4, 共役類は計15個

$H_{21}=\langle\sigma_{28}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_{25}, \sigma_{28}, \sigma_{29}\}$: (1, 2)の置換と(3, 4, 5)の偶置換の積, 位数6, 共役類は計10個

$H_{26}=\langle\sigma_{34}\rangle=\{\sigma_1, \sigma_{34}, \sigma_{65}, \sigma_{91}, \sigma_{97}\}$: (1, 2, 3, 4, 5)の巡回置換, 位数5, 共役類は計6個

2個の元から生成される部分群は以下の89個である。

$H_{68}=\langle\sigma_2, \sigma_3\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6\}$: (3, 4, 5)の全置換, 位数6, 共役類は計10個

$H_{69}=\langle\sigma_2, \sigma_7\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8\}$: (2, 3)の置換と(4, 5)の置換の積, 位数4, 共役類は計15個

$H_{70}=\langle\sigma_2, \sigma_9\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}, \sigma_{16}, \sigma_{17}, \sigma_{18}, \sigma_{19}, \sigma_{20}, \sigma_{21}, \cdots, \sigma_{24}\}$: (2, 3, 4, 5)の全置換, 位数24, 共役類は計5個

$H_{72}=\langle\sigma_2, \sigma_{17}\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8, \sigma_{17}, \sigma_{18}, \sigma_{23}, \sigma_{24}\}$: (2, 4, 3, 5)の巡回置換と(4, 5)の置換の積, 位数8, 共役類は計15個

$H_{74}=\langle\sigma_2, \sigma_{27}\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_{25}, \sigma_{26}, \sigma_{27}, \sigma_{28}, \sigma_{29}, \sigma_{30}\}$: (1, 2)の置換と(3, 4, 5)の全置換の積, 位数12, 共役類は計10個

$H_{75}=\langle\sigma_2, \sigma_{33}\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}, \sigma_{16}, \sigma_{17}, \sigma_{18}, \sigma_{19}, \sigma_{20}, \cdots, \sigma_{120}\}$: (1, 2, 3, 4, 5)の全置換, 位数120

$H_{95}=\langle\sigma_4, \sigma_8\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_8, \sigma_9, \sigma_{12}, \sigma_{13}, \sigma_{16}, \sigma_{17}, \sigma_{20}, \sigma_{21}, \sigma_{24}\}$: (2, 3, 4, 5)の偶置換, 位数12, 共役類は計5個

$H_{96}=\langle\sigma_4, \sigma_{26}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_{26}, \sigma_{27}, \sigma_{30}\}$: (3, 4, 5)の全置換で, そのうちの奇置換では(1, 2)を交換したもの, 位数6, 共役類は計10個

$H_{97}=\langle\sigma_4, \sigma_{31}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_8, \sigma_9, \sigma_{12}, \sigma_{13}, \sigma_{16}, \sigma_{17}, \sigma_{20}, \sigma_{21}, \sigma_{24}, \sigma_{26}, \sigma_{27}, \sigma_{30}, \sigma_{31}, \sigma_{34}, \sigma_{35}, \sigma_{38}, \sigma_{39}, \cdots, \sigma_{120}\}$: (1, 2, 3, 4, 5)の偶置換, 位数60

$H_{116}=\langle\sigma_8, \sigma_{17}\rangle=\{\sigma_1, \sigma_8, \sigma_{17}, \sigma_{24}\}$: $\{\{1,2,3,4,5\}, \{1,3,2,5,4\}, \{1,4,5,2,3\}, \{1,5,4,3,2\}\}$, 位数4, 共役類は計5個

$H_{118}=\langle\sigma_8, \sigma_{27}\rangle=\{\sigma_1, \sigma_8, \sigma_{27}, \sigma_{38}, \sigma_{53}, \sigma_{68}, \sigma_{83}, \sigma_{94}, \sigma_{113}, \sigma_{120}\}$: (2, 3)の置換と(4, 5)の置換を同時に行ったものと(1, 2, 4, 5, 3)の巡回置換の積, 位数10, 共役類は計6個

$H_{120}=\langle\sigma_8, \sigma_{33}\rangle=\{\sigma_1, \sigma_8, \sigma_{18}, \sigma_{23}, \sigma_{30}, \sigma_{33}, \sigma_{40}, \sigma_{43}, \sigma_{52}, \sigma_{59}, \sigma_{61}, \sigma_{70}, \sigma_{73}, \sigma_{80}, \sigma_{90}, \sigma_{95}, \sigma_{99}, \sigma_{108}, \sigma_{110}, \sigma_{117}\}$: (1, 2, 5, 4, 3)の巡回置換と(2, 4, 3, 5)の巡回置換の積, 位数20, 共役類は計6個

3個の元から生成される部分群はない。以上より5次対称群の部分群は156個である。5次対称群の部分群を共役類で分類して下表に示す。これは参考文献(1)の3頁の表と一致する。

位数	部分群
1	$H_1=\langle\sigma_1\rangle$
2	$H_2=\langle\sigma_2\rangle$, $H_3=\langle\sigma_3\rangle$, $H_5=\langle\sigma_6\rangle$, $H_6=\langle\sigma_7\rangle$, $H_{12}=\langle\sigma_{15}\rangle$, $H_{16}=\langle\sigma_{22}\rangle$, $H_{18}=\langle\sigma_{25}\rangle$, $H_{41}=\langle\sigma_{55}\rangle$, $H_{54}=\langle\sigma_{81}\rangle$, $H_{63}=\langle\sigma_{106}\rangle$
	$H_7=\langle\sigma_8\rangle$, $H_{14}=\langle\sigma_{17}\rangle$, $H_{17}=\langle\sigma_{24}\rangle$, $H_{19}=\langle\sigma_{26}\rangle$, $H_{20}=\langle\sigma_{27}\rangle$, $H_{22}=\langle\sigma_{30}\rangle$, $H_{42}=\langle\sigma_{56}\rangle$, $H_{47}=\langle\sigma_{61}\rangle$, $H_{51}=\langle\sigma_{68}\rangle$, $H_{56}=\langle\sigma_{83}\rangle$, $H_{58}=\langle\sigma_{87}\rangle$, $H_{61}=\langle\sigma_{95}\rangle$, $H_{64}=\langle\sigma_{108}\rangle$, $H_{65}=\langle\sigma_{112}\rangle$, $H_{67}=\langle\sigma_{120}\rangle$
3	$H_4=\langle\sigma_4\rangle$, $H_8=\langle\sigma_9\rangle$, $H_{11}=\langle\sigma_{12}\rangle$, $H_{13}=\langle\sigma_{16}\rangle$, $H_{23}=\langle\sigma_{31}\rangle$, $H_{31}=\langle\sigma_{39}\rangle$, $H_{38}=\langle\sigma_{46}\rangle$, $H_{43}=\langle\sigma_{57}\rangle$, $H_{46}=\langle\sigma_{60}\rangle$, $H_{55}=\langle\sigma_{82}\rangle$
4	$H_9=\langle\sigma_{10}\rangle$, $H_{10}=\langle\sigma_{11}\rangle$, $H_{15}=\langle\sigma_{18}\rangle$, $H_{25}=\langle\sigma_{33}\rangle$, $H_{28}=\langle\sigma_{36}\rangle$, $H_{29}=\langle\sigma_{37}\rangle$, $H_{32}=\langle\sigma_{40}\rangle$, $H_{36}=\langle\sigma_{44}\rangle$, $H_{37}=\langle\sigma_{45}\rangle$, $H_{44}=\langle\sigma_{58}\rangle$, $H_{45}=\langle\sigma_{59}\rangle$, $H_{49}=\langle\sigma_{63}\rangle$, $H_{52}=\langle\sigma_{70}\rangle$, $H_{57}=\langle\sigma_{84}\rangle$, $H_{62}=\langle\sigma_{96}\rangle$
	$H_{69}=\langle\sigma_2, \sigma_7\rangle$, $H_{73}=\langle\sigma_2, \sigma_{25}\rangle$, $H_{77}=\langle\sigma_2, \sigma_{55}\rangle$, $H_{86}=\langle\sigma_3, \sigma_{22}\rangle$, $H_{87}=\langle\sigma_3, \sigma_{25}\rangle$, $H_{93}=\langle\sigma_3, \sigma_{106}\rangle$, $H_{101}=\langle\sigma_6, \sigma_{15}\rangle$, $H_{102}=\langle\sigma_6, \sigma_{25}\rangle$, $H_{108}=\langle\sigma_6, \sigma_{81}\rangle$, $H_{114}=\langle\sigma_7, \sigma_{81}\rangle$, $H_{115}=\langle\sigma_7, \sigma_{106}\rangle$, $H_{135}=\langle\sigma_{15}, \sigma_{55}\rangle$, $H_{136}=\langle\sigma_{15}, \sigma_{106}\rangle$, $H_{147}=\langle\sigma_{22}, \sigma_{55}\rangle$, $H_{148}=\langle\sigma_{22}, \sigma_{81}\rangle$
	$H_{116}=\langle\sigma_8, \sigma_{17}\rangle$, $H_{153}=\langle\sigma_{26}, \sigma_{95}\rangle$, $H_{154}=\langle\sigma_{27}, \sigma_{61}\rangle$, $H_{155}=\langle\sigma_{30}, \sigma_{68}\rangle$, $H_{156}=\langle\sigma_{56}, \sigma_{83}\rangle$
5	$H_{26}=\langle\sigma_{34}\rangle$, $H_{27}=\langle\sigma_{35}\rangle$, $H_{30}=\langle\sigma_{38}\rangle$, $H_{34}=\langle\sigma_{42}\rangle$, $H_{35}=\langle\sigma_{43}\rangle$, $H_{39}=\langle\sigma_{47}\rangle$
6	$H_{21}=\langle\sigma_{28}\rangle$, $H_{24}=\langle\sigma_{32}\rangle$, $H_{33}=\langle\sigma_{41}\rangle$, $H_{40}=\langle\sigma_{48}\rangle$, $H_{48}=\langle\sigma_{62}\rangle$, $H_{50}=\langle\sigma_{66}\rangle$, $H_{53}=\langle\sigma_{71}\rangle$, $H_{59}=\langle\sigma_{88}\rangle$, $H_{60}=\langle\sigma_{89}\rangle$, $H_{66}=\langle\sigma_{114}\rangle$
	$H_{68}=\langle\sigma_2, \sigma_3\rangle$, $H_{71}=\langle\sigma_2, \sigma_{15}\rangle$, $H_{80}=\langle\sigma_2, \sigma_{81}\rangle$, $H_{84}=\langle\sigma_3, \sigma_7\rangle$, $H_{89}=\langle\sigma_3, \sigma_{55}\rangle$, $H_{99}=\langle\sigma_6, \sigma_7\rangle$, $H_{104}=\langle\sigma_6, \sigma_{55}\rangle$, $H_{110}=\langle\sigma_7, \sigma_{25}\rangle$, $H_{131}=\langle\sigma_{15}, \sigma_{25}\rangle$, $H_{143}=\langle\sigma_{22}, \sigma_{25}\rangle$
	$H_{96}=\langle\sigma_4, \sigma_{26}\rangle$, $H_{117}=\langle\sigma_8, \sigma_{26}\rangle$, $H_{122}=\langle\sigma_8, \sigma_{82}\rangle$, $H_{124}=\langle\sigma_9, \sigma_{108}\rangle$, $H_{130}=\langle\sigma_{12}, \sigma_{83}\rangle$, $H_{138}=\langle\sigma_{16}, \sigma_{56}\rangle$, $H_{141}=\langle\sigma_{17}, \sigma_{30}\rangle$, $H_{142}=\langle\sigma_{17}, \sigma_{60}\rangle$, $H_{150}=\langle\sigma_{24}, \sigma_{27}\rangle$, $H_{152}=\langle\sigma_{24}, \sigma_{57}\rangle$
8	$H_{72}=\langle\sigma_2, \sigma_{17}\rangle$, $H_{81}=\langle\sigma_2, \sigma_{83}\rangle$, $H_{83}=\langle\sigma_2, \sigma_{95}\rangle$, $H_{85}=\langle\sigma_3, \sigma_8\rangle$, $H_{90}=\langle\sigma_3, \sigma_{56}\rangle$, $H_{91}=\langle\sigma_3, \sigma_{61}\rangle$, $H_{100}=\langle\sigma_6, \sigma_8\rangle$, $H_{105}=\langle\sigma_6, \sigma_{56}\rangle$, $H_{107}=\langle\sigma_6, \sigma_{68}\rangle$, $H_{112}=\langle\sigma_7, \sigma_{27}\rangle$, $H_{113}=\langle\sigma_7, \sigma_{30}\rangle$, $H_{132}=\langle\sigma_{15}, \sigma_{26}\rangle$, $H_{133}=\langle\sigma_{15}, \sigma_{27}\rangle$, $H_{144}=\langle\sigma_{22}, \sigma_{26}\rangle$, $H_{146}=\langle\sigma_{22}, \sigma_{30}\rangle$
10	$H_{118}=\langle\sigma_8, \sigma_{27}\rangle$, $H_{119}=\langle\sigma_8, \sigma_{30}\rangle$, $H_{139}=\langle\sigma_{17}, \sigma_{26}\rangle$, $H_{140}=\langle\sigma_{17}, \sigma_{27}\rangle$, $H_{149}=\langle\sigma_{24}, \sigma_{26}\rangle$, $H_{151}=\langle\sigma_{24}, \sigma_{30}\rangle$
12	$H_{74}=\langle\sigma_2, \sigma_{27}\rangle$, $H_{79}=\langle\sigma_2, \sigma_{61}\rangle$, $H_{82}=\langle\sigma_2, \sigma_{87}\rangle$, $H_{92}=\langle\sigma_3, \sigma_{68}\rangle$, $H_{94}=\langle\sigma_3, \sigma_{112}\rangle$, $H_{106}=\langle\sigma_6, \sigma_{61}\rangle$, $H_{109}=\langle\sigma_6, \sigma_{87}\rangle$, $H_{111}=\langle\sigma_7, \sigma_{26}\rangle$, $H_{134}=\langle\sigma_{15}, \sigma_{30}\rangle$, $H_{145}=\langle\sigma_{22}, \sigma_{27}\rangle$
	$H_{95}=\langle\sigma_4, \sigma_8\rangle$, $H_{98}=\langle\sigma_4, \sigma_{56}\rangle$, $H_{123}=\langle\sigma_9, \sigma_{27}\rangle$, $H_{129}=\langle\sigma_{12}, \sigma_{30}\rangle$, $H_{137}=\langle\sigma_{16}, \sigma_{26}\rangle$
20	$H_{120}=\langle\sigma_8, \sigma_{33}\rangle$, $H_{121}=\langle\sigma_8, \sigma_{36}\rangle$, $H_{125}=\langle\sigma_{10}, \sigma_{26}\rangle$, $H_{126}=\langle\sigma_{10}, \sigma_{27}\rangle$, $H_{127}=\langle\sigma_{11}, \sigma_{26}\rangle$, $H_{128}=\langle\sigma_{11}, \sigma_{30}\rangle$
24	$H_{70}=\langle\sigma_2, \sigma_9\rangle$, $H_{76}=\langle\sigma_2, \sigma_{39}\rangle$, $H_{78}=\langle\sigma_2, \sigma_{57}\rangle$, $H_{88}=\langle\sigma_3, \sigma_{31}\rangle$, $H_{103}=\langle\sigma_6, \sigma_{31}\rangle$
60	$H_{97}=\langle\sigma_4, \sigma_{31}\rangle$
120	$H_{75}=\langle\sigma_2, \sigma_{33}\rangle$

≪交換子群の計算≫

$D(G)=\langle\{\sigma^{-1}\tau^{-1}\sigma\tau\,|\,\sigma,\tau\in G\}\rangle$で表される群を$G$の交換子群という。$G$が可解であるための条件は，交換子群の列$D(G), D^2(G), D^3(G), \cdots$ を求めたとき，列の最後が単位群になることである。以下に示すのは，k番目の部分群$H[k]$の交換子群の列を求め，その番号を配列Sに代入するアルゴリズムである。

```
S={k};
l=k;
while(true){
  T=<{σ^-1τ^-1στ|σ,τ∈H[l]}>;
  T=sort(T);
  for(j=1; j<=c; j++){
    if(H[j]==T) break;
  }
  if(j∈S) break;
  S=S∪j;
  l=j;
}
```

5次対称群の部分群のうち，可移である以下の5個の共役類について，交換子群の列を示す。

H_{26}(位数5)の場合：$\{H_{26}, H_1$(単位群)$\}$

H_{118}(位数10)の場合：$\{H_{118}, H_{30}$(位数5, H_{26}の共役類), H_1(単位群)$\}$

H_{120}(位数20)の場合：$\{H_{120}, H_{35}$(位数5, H_{26}の共役類), H_1(単位群)$\}$

H_{97}(位数60)の場合：$\{H_{97}\}$

H_{75}(位数120)の場合：$\{H_{75}, H_{97}$(位数60)$\}$

これより，可移で可解な部分群(既約で可解な5次方程式のガロア群に対応する)は，H_{26}(位数5)，H_{118}(位数10)，H_{120}(位数20)とそれらの共役類である。

4. 6次対称群の部分群

この場合はn=6, N=720で, Gは以下のように表される。(途中は省略)

$$G=\{\sigma_1, \cdots, \sigma_{121}, \cdots, \sigma_{241}, \cdots, \sigma_{361}, \cdots, \sigma_{481}, \cdots, \sigma_{601}, \cdots, \sigma_{720}\}$$
$$=\{\{1,2,3,4,5,6\}, \cdots, \{2,1,3,4,5,6\}, \cdots, \{3,1,2,4,5,6\}, \cdots,$$
$$\{4,1,2,3,5,6\}, \cdots, \{5,1,2,3,4,6\}, \cdots, \{6,1,2,3,4,5\}, \cdots, \{6,5,4,3,2,1\}\}$$

1個の元から生成される部分群は以下の362個である。ただし, 同一の共役類に属する部分群は, 代表の1個(最初に見つかったもの)だけを示す。

$H_1=\langle\sigma_1\rangle=\{\sigma_1\}$: 単位群, 位数1

$H_2=\langle\sigma_2\rangle=\{\sigma_1, \sigma_2\}$: (5, 6)の置換, 位数2, 共役類は計5個

$H_4=\langle\sigma_4\rangle=\{\sigma_1, \sigma_4, \sigma_5\}$: (4, 5, 6)の偶置換, 位数3, 共役類は計20個

$H_7=\langle\sigma_8\rangle=\{\sigma_1, \sigma_8\}$: (3, 4)の置換と(5, 6)の置換を同時に行ったもの, 位数2, 共役類は計45個

$H_9=\langle\sigma_{10}\rangle=\{\sigma_1, \sigma_{10}, \sigma_{17}, \sigma_{19}\}$: (3, 4, 5, 6)の巡回置換, 位数4, 共役類は計45個

$H_{21}=\langle\sigma_{28}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_{25}, \sigma_{28}, \sigma_{29}\}$: (2, 3)の置換と(4, 5, 6)の偶置換の積, 位数6, 共役類は計60個

$H_{26}=\langle\sigma_{34}\rangle=\{\sigma_1, \sigma_{34}, \sigma_{65}, \sigma_{91}, \sigma_{97}\}$: (2, 3, 4, 5, 6)の巡回置換, 位数5, 共役類は計36個

$H_{74}=\langle\sigma_{128}\rangle=\{\sigma_1, \sigma_{128}\}$: (1, 2)の置換と(3, 4)の置換と(5, 6)の置換を同時に行ったもの, 位数2, 共役類は計15個

$H_{76}=\langle\sigma_{130}\rangle=\{\sigma_1, \sigma_{17}, \sigma_{130}, \sigma_{139}\}$: (3, 4, 5, 6)の巡回置換で, そのうちの奇置換では(1, 2)を交換したもの, 位数4, 共役類は計45個

$H_{88}=\langle\sigma_{148}\rangle=\{\sigma_1, \sigma_{148}, \sigma_{245}\}$: (1, 2, 3)の偶置換と(4, 5, 6)の偶置換を同時に行ったもの, 位数3, 共役類は計20個

$H_{94}=\langle\sigma_{154}\rangle=\{\sigma_1, \sigma_{154}, \sigma_{305}, \sigma_{451}, \sigma_{577}, \sigma_{601}\}$: (1, 2, 3, 4, 5, 6)の巡回置換, 位数6, 共役類は計60個

2個の元から生成される部分群は以下の1008個である。

$H_{363}=\langle\sigma_2, \sigma_3\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6\}$: (4, 5, 6)の全置換, 位数6, 共役類は計20個

$H_{364}=\langle\sigma_2, \sigma_7\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8\}$: (3, 4)の置換と(5, 6)の置換の積, 位数4, 共役類は計45個

$H_{365}=\langle\sigma_2, \sigma_9\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}, \sigma_{16}, \sigma_{17}, \sigma_{18}, \sigma_{19}, \sigma_{20}, \sigma_{21}, \cdots, \sigma_{24}\}$: (3, 4, 5, 6)の全置換, 位数24, 共役類は計15個

$H_{367}=\langle\sigma_2, \sigma_{17}\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8, \sigma_{17}, \sigma_{18}, \sigma_{23}, \sigma_{24}\}$: (3, 5, 4, 6)の巡回置換と(5, 6)の置換の積, 位数8, 共役類は計45個

$H_{369}=\langle\sigma_2, \sigma_{27}\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_{25}, \sigma_{26}, \sigma_{27}, \sigma_{28}, \sigma_{29}, \sigma_{30}\}$: (2, 3)の置換と(4, 5, 6)の全置換の積, 位数12, 共役類は計60個

$H_{370}=\langle\sigma_2, \sigma_{33}\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}, \sigma_{16}, \sigma_{17}, \sigma_{18}, \sigma_{19}, \sigma_{20}, \cdots, \sigma_{120}\}$: (2, 3, 4, 5, 6)の全置換, 位数120, 共役類は計6個

$H_{381}=\langle\sigma_2, \sigma_{127}\rangle=\{\sigma_1, \sigma_2, \sigma_{127}, \sigma_{128}\}$: (1, 2)の置換と(3, 4)の置換を同時に行ったものと(5, 6)の置換の積, 位数4, 共役類は計45個

$H_{382}=\langle\sigma_2, \sigma_{129}\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}, \sigma_{16}, \sigma_{17}, \sigma_{18}, \sigma_{19}, \sigma_{20}, \cdots, \sigma_{144}\}$: (1, 2)の置換と(3, 4, 5, 6)の全置換の積, 位数48, 共役類は計15個

$H_{384}=\langle\sigma_2, \sigma_{137}\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8, \sigma_{137}, \sigma_{138}, \sigma_{143}, \sigma_{144}\}$: (3, 4)の置換と(5, 6)の置換の積と, これに(1, 2)と(3, 5)と(4, 6)を3組同時に交換したものの和集合, 位数8, 共役類は計45個

$H_{385}=\langle\sigma_2, \sigma_{147}\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_{145}, \sigma_{146}, \sigma_{147}, \sigma_{148}, \sigma_{149}, \sigma_{150}, \sigma_{241}, \sigma_{242}, \sigma_{243}, \sigma_{244}, \sigma_{245}, \sigma_{246}\}$: (1, 2, 3)の偶置換と(4, 5, 6)の全置換の積, 位数18, 共役類は計20個

$H_{386}=\langle\sigma_2, \sigma_{151}\rangle=\{\sigma_1, \sigma_2, \sigma_{151}, \sigma_{152}, \sigma_{289}, \sigma_{290}, \sigma_{361}, \sigma_{362}\}$: (1, 2, 3, 4)の巡回置換と(5, 6)の置換の積, 位

数8，共役類は計45個

$H_{387}=\langle\sigma_2, \sigma_{153}\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}, \sigma_{16}, \sigma_{17}, \sigma_{18}, \sigma_{19}, \sigma_{20}, \cdots, \sigma_{720}\}$：(1, 2, 3, 4, 5, 6)の全置換，位数720

$H_{389}=\langle\sigma_2, \sigma_{161}\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8, \sigma_{81}, \sigma_{82}, \sigma_{87}, \sigma_{88}, \sigma_{105}, \sigma_{106}, \sigma_{111}, \sigma_{112}, \sigma_{137}, \sigma_{138}, \sigma_{143}, \sigma_{144}, \sigma_{161}, \sigma_{162}, \cdots, \sigma_{694}\}$：(1, 2, 3, 5, 4, 6)の巡回置換と(2, 5, 6)の偶置換と(3, 4)の置換と(5, 6)の置換の積，位数72，共役類は計10個

$H_{396}=\langle\sigma_2, \sigma_{209}\rangle=\{\sigma_1, \sigma_2, \sigma_{55}, \sigma_{56}, \sigma_{209}, \sigma_{210}, \sigma_{233}, \sigma_{234}, \sigma_{265}, \sigma_{266}, \sigma_{289}, \sigma_{290}, \sigma_{443}, \sigma_{444}, \sigma_{467}, \sigma_{468}, \sigma_{501}, \cdots, \sigma_{668}\}$：(1, 2, 5, 3, 4, 6)の巡回置換と(2, 4)の置換と(5, 6)の置換の積，位数24，共役類は計15個

$H_{483}=\langle\sigma_4, \sigma_8\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_8, \sigma_9, \sigma_{12}, \sigma_{13}, \sigma_{16}, \sigma_{17}, \sigma_{20}, \sigma_{21}, \sigma_{24}\}$：(3, 4, 5, 6)の偶置換，位数12，共役類は計15個

$H_{484}=\langle\sigma_4, \sigma_{26}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_{26}, \sigma_{27}, \sigma_{30}\}$：(4, 5, 6)の全置換で，そのうちの奇置換では(2, 3)を交換したもの，位数6，共役類は計60個

$H_{485}=\langle\sigma_4, \sigma_{31}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_8, \sigma_9, \sigma_{12}, \sigma_{13}, \sigma_{16}, \sigma_{17}, \sigma_{20}, \sigma_{21}, \sigma_{24}, \sigma_{26}, \sigma_{27}, \sigma_{30}, \sigma_{31}, \sigma_{34}, \sigma_{35}, \sigma_{38}, \sigma_{39}, \cdots, \sigma_{120}\}$：(2, 3, 4, 5, 6)の偶置換，位数60，共役類は計6個

$H_{488}=\langle\sigma_4, \sigma_{127}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_8, \sigma_9, \sigma_{12}, \sigma_{13}, \sigma_{16}, \sigma_{17}, \sigma_{20}, \sigma_{21}, \sigma_{24}, \sigma_{122}, \sigma_{123}, \sigma_{126}, \sigma_{127}, \sigma_{130}, \sigma_{131}, \cdots, \sigma_{143}\}$：(3, 4, 5, 6)の全置換で，そのうちの奇置換では(1, 2)を交換したもの，位数24，共役類は計15個

$H_{489}=\langle\sigma_4, \sigma_{128}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_8, \sigma_9, \sigma_{12}, \sigma_{13}, \sigma_{16}, \sigma_{17}, \sigma_{20}, \sigma_{21}, \sigma_{24}, \sigma_{121}, \sigma_{124}, \sigma_{125}, \sigma_{128}, \sigma_{129}, \sigma_{132}, \cdots, \sigma_{144}\}$：(1, 2)の置換と(3, 4, 5, 6)の偶置換の積，位数24，共役類は計15個

$H_{490}=\langle\sigma_4, \sigma_{145}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_{145}, \sigma_{148}, \sigma_{149}, \sigma_{241}, \sigma_{244}, \sigma_{245}\}$：(1, 2, 3)の偶置換と(4, 5, 6)の偶置換の積，位数9，共役類は計10個

$H_{491}=\langle\sigma_4, \sigma_{152}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_8, \sigma_9, \sigma_{12}, \sigma_{13}, \sigma_{16}, \sigma_{17}, \sigma_{20}, \sigma_{21}, \sigma_{24}, \sigma_{26}, \sigma_{27}, \sigma_{30}, \sigma_{31}, \sigma_{34}, \sigma_{35}, \sigma_{38}, \cdots, \sigma_{719}\}$：(1, 2, 3, 4, 5, 6)の偶置換，位数360

$H_{500}=\langle\sigma_4, \sigma_{451}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_{145}, \sigma_{148}, \sigma_{149}, \sigma_{241}, \sigma_{244}, \sigma_{245}, \sigma_{451}, \sigma_{454}, \sigma_{455}, \sigma_{595}, \sigma_{598}, \sigma_{599}, \sigma_{691}, \sigma_{694}, \sigma_{695}\}$：(1, 2, 3)の偶置換と(4, 5, 6)の偶置換の積と，これに(1, 4)と(2, 5)と(3, 6)を3組同時に交換したものの和集合，位数18，共役類は計20個

$H_{501}=\langle\sigma_4, \sigma_{452}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_{26}, \sigma_{27}, \sigma_{30}, \sigma_{122}, \sigma_{123}, \sigma_{126}, \sigma_{145}, \sigma_{148}, \sigma_{149}, \sigma_{241}, \sigma_{244}, \sigma_{245}, \sigma_{266}, \sigma_{267}, \cdots, \sigma_{719}\}$：(1, 2, 3)の全置換と(4, 5, 6)の全置換の積で，そのうちの奇置換では(1, 4)と(2, 5)と(3, 6)を3組同時に交換したもの，位数36，共役類は計10個

$H_{590}=\langle\sigma_8, \sigma_{17}\rangle=\{\sigma_1, \sigma_8, \sigma_{17}, \sigma_{24}\}$：$\{\{1, 2, 3, 4, 5, 6\}, \{1, 2, 4, 3, 6, 5\}, \{1, 2, 5, 6, 3, 4\}, \{1, 2, 6, 5, 4, 3\}\}$，位数4，共役類は計15個

$H_{592}=\langle\sigma_8, \sigma_{27}\rangle=\{\sigma_1, \sigma_8, \sigma_{27}, \sigma_{38}, \sigma_{53}, \sigma_{68}, \sigma_{83}, \sigma_{94}, \sigma_{113}, \sigma_{120}\}$：(3, 4)の置換と(5, 6)の置換を同時に行ったものと(2, 3, 5, 6, 4)の巡回置換の積，位数10，共役類は計36個

$H_{594}=\langle\sigma_8, \sigma_{33}\rangle=\{\sigma_1, \sigma_8, \sigma_{18}, \sigma_{23}, \sigma_{30}, \sigma_{33}, \sigma_{40}, \sigma_{43}, \sigma_{52}, \sigma_{59}, \sigma_{61}, \sigma_{70}, \sigma_{73}, \sigma_{80}, \sigma_{90}, \sigma_{95}, \sigma_{99}, \sigma_{108}, \sigma_{110}, \sigma_{117}\}$：(2, 3, 6, 5, 4)の巡回置換と(3, 5, 4, 6)の巡回置換の積，位数20，共役類は計36個

$H_{598}=\langle\sigma_8, \sigma_{122}\rangle=\{\sigma_1, \sigma_8, \sigma_{122}, \sigma_{127}\}$：(1, 2)の置換と(3, 4)の置換と(5, 6)の置換の積のうち，偶置換だけを取り出したもの，位数4，共役類は計15個

$H_{599}=\langle\sigma_8, \sigma_{123}\rangle=\{\sigma_1, \sigma_8, \sigma_{17}, \sigma_{24}, \sigma_{123}, \sigma_{131}, \sigma_{134}, \sigma_{142}\}$：$\{\{1, 2, 3, 4, 5, 6\}, \{1, 2, 4, 3, 6, 5\}, \{1, 2, 5, 6, 3, 4\}, \{1, 2, 6, 5, 4, 3\}, \{2, 1, 3, 5, 4, 6\}, \{2, 1, 4, 6, 3, 5\}, \{2, 1, 5, 3, 6, 4\}, \{2, 1, 6, 4, 5, 3\}\}$，位数8，共役類は計45個

$H_{601}=\langle\sigma_8, \sigma_{137}\rangle=\{\sigma_1, \sigma_8, \sigma_{137}, \sigma_{144}\}$：$\{\{1, 2, 3, 4, 5, 6\}, \{1, 2, 4, 3, 6, 5\}, \{2, 1, 5, 6, 3, 4\}, \{2, 1, 6, 5, 4, 3\}\}$，位数4，共役類は計45個

$H_{603}=\langle\sigma_8, \sigma_{148}\rangle=\{\sigma_1, \sigma_8, \sigma_{30}, \sigma_{43}, \sigma_{52}, \sigma_{61}, \sigma_{90}, \sigma_{95}, \sigma_{108}, \sigma_{117}, \sigma_{122}, \sigma_{127}, \sigma_{148}, \sigma_{157}, \sigma_{174}, \sigma_{187}, \sigma_{204}, \cdots, \sigma_{703}\}$：(1, 2, 3, 4, 6, 5)の巡回置換と(2, 3, 6, 5, 4)の巡回置換と(3, 5, 4, 6)の巡回置換の積のうち，偶置換だけを取り出したもの，位数60，共役類は計6個

$H_{605}=\langle\sigma_8, \sigma_{154}\rangle=\{\sigma_1, \sigma_8, \sigma_{18}, \sigma_{23}, \sigma_{27}, \sigma_{36}, \sigma_{38}, \sigma_{45}, \sigma_{53}, \sigma_{58}, \sigma_{63}, \sigma_{68}, \sigma_{76}, \sigma_{83}, \sigma_{85}, \sigma_{94}, \sigma_{98}, \sigma_{103}, \sigma_{113}, \cdots, \sigma_{720}\}$：(1, 2, 3, 4, 5, 6)の巡回置換と(2, 3, 5, 6, 4)の巡回置換と(3, 5, 4, 6)の巡回置換の積，位数120，共役類は計6個

$H_{608}=\langle\sigma_8, \sigma_{162}\rangle=\{\sigma_1, \sigma_8, \sigma_{82}, \sigma_{87}, \sigma_{105}, \sigma_{112}, \sigma_{137}, \sigma_{144}, \sigma_{162}, \sigma_{167}, \sigma_{185}, \sigma_{192}, \sigma_{266}, \sigma_{271}, \sigma_{315}, \sigma_{326}, \sigma_{340}, \cdots, \sigma_{694}\}$：{{1, 2, 3, 4, 5, 6}, {1, 2, 4, 3, 6, 5}, {2, 1, 5, 6, 3, 4}, {2, 1, 6, 5, 4, 3}}と(1, 3, 4)の偶置換と(2, 5, 6)の偶置換との積，位数36，共役類は計10個

$H_{618}=\langle\sigma_8, \sigma_{290}\rangle=\{\sigma_1, \sigma_8, \sigma_{122}, \sigma_{127}, \sigma_{290}, \sigma_{295}, \sigma_{409}, \sigma_{416}\}$：(3, 4)の置換と(5, 6)の置換を同時に行ったものと(1, 3, 2, 4)の巡回置換の積，位数8，共役類は計45個

$H_{619}=\langle\sigma_8, \sigma_{305}\rangle=\{\sigma_1, \sigma_8, \sigma_{122}, \sigma_{127}, \sigma_{305}, \sigma_{312}, \sigma_{426}, \sigma_{431}, \sigma_{577}, \sigma_{584}, \sigma_{698}, \sigma_{703}\}$：(1, 3, 5, 2, 4, 6)の巡回置換と(3, 4)の置換と(5, 6)の置換の積のうち，偶置換だけを取り出したもの，位数12，共役類は計15個

$H_{620}=\langle\sigma_8, \sigma_{315}\rangle=\{\sigma_1, \sigma_8, \sigma_{315}, \sigma_{326}, \sigma_{459}, \sigma_{470}\}$：(1, 3, 4)の全置換と(2, 5, 6)の全置換を同時に行ったもの，位数6，共役類は計60個

$H_{621}=\langle\sigma_8, \sigma_{316}\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8, \sigma_{81}, \sigma_{82}, \sigma_{87}, \sigma_{88}, \sigma_{105}, \sigma_{106}, \sigma_{111}, \sigma_{112}, \sigma_{265}, \sigma_{266}, \sigma_{271}, \sigma_{272}, \sigma_{315}, \sigma_{316}, \cdots, \sigma_{470}\}$：(1, 3, 4)の全置換と(2, 5, 6)の全置換の積，位数36，共役類は計10個

$H_{622}=\langle\sigma_8, \sigma_{317}\rangle=\{\sigma_1, \sigma_8, \sigma_{137}, \sigma_{144}, \sigma_{317}, \sigma_{332}, \sigma_{461}, \sigma_{476}, \sigma_{537}, \sigma_{544}, \sigma_{681}, \sigma_{688}\}$：(3, 4)の置換と(5, 6)の置換を同時に行ったものと(1, 3, 6, 2, 5, 4)の巡回置換の積，位数12，共役類は計60個

$H_{623}=\langle\sigma_8, \sigma_{321}\rangle=\{\sigma_1, \sigma_6, \sigma_8, \sigma_{10}, \sigma_{15}, \sigma_{17}, \sigma_{19}, \sigma_{24}, \sigma_{121}, \sigma_{126}, \sigma_{128}, \sigma_{130}, \sigma_{135}, \sigma_{137}, \sigma_{139}, \sigma_{144}, \sigma_{315}, \cdots, \sigma_{694}\}$：(1, 3, 4, 2, 5, 6)の巡回置換と(3, 4, 5, 6)の巡回置換と(4, 6)の置換の積，位数48，共役類は計15個

$H_{624}=\langle\sigma_8, \sigma_{323}\rangle=\{\sigma_1, \sigma_8, \sigma_{17}, \sigma_{24}, \sigma_{126}, \sigma_{130}, \sigma_{135}, \sigma_{139}, \sigma_{315}, \sigma_{323}, \sigma_{326}, \sigma_{334}, \sigma_{459}, \sigma_{467}, \sigma_{470}, \sigma_{478}, \sigma_{533}, \cdots, \sigma_{692}\}$：(1, 3, 4, 2, 5, 6)の巡回置換と(3, 4, 5, 6)の巡回置換と(4, 6)の置換の積のうち，偶置換だけを取り出したもの，位数24，共役類は計15個

$H_{659}=\langle\sigma_{10}, \sigma_{317}\rangle=\{\sigma_1, \sigma_{10}, \sigma_{17}, \sigma_{19}, \sigma_{126}, \sigma_{128}, \sigma_{135}, \sigma_{144}, \sigma_{317}, \sigma_{321}, \sigma_{326}, \sigma_{334}, \sigma_{459}, \sigma_{467}, \sigma_{472}, \sigma_{476}, \cdots, \sigma_{694}\}$：(1, 3, 6)の偶置換と(2, 5, 4)の偶置換を同時に行ったものと(3, 4, 5, 6)の巡回置換の積と，これに(1, 2)と(3, 4)と(5, 6)を3組同時に交換したものの和集合，位数24，共役類は計15個

$H_{1321}=\langle\sigma_{128}, \sigma_{317}\rangle=\{\sigma_1, \sigma_{128}, \sigma_{317}, \sigma_{467}, \sigma_{548}, \sigma_{694}\}$：(1, 4, 5)の偶置換と(2, 6, 3)の偶置換を同時に行ったものと，これに(1, 2)と(3, 4)と(5, 6)を3組同時に交換したものの和集合，位数6，共役類は計20個

3個の元から生成される部分群は以下の85個である。

$H_{1371}=\langle\sigma_2, \sigma_7, \sigma_{121}\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8, \sigma_{121}, \sigma_{122}, \sigma_{127}, \sigma_{128}\}$：(1, 2)の置換と(3, 4)の置換と(5, 6)の置換の積，位数8，共役類は計15個

$H_{1372}=\langle\sigma_2, \sigma_7, \sigma_{289}\rangle=\{\sigma_1, \sigma_2, \sigma_7, \sigma_8, \sigma_{121}, \sigma_{122}, \sigma_{127}, \sigma_{128}, \sigma_{289}, \sigma_{290}, \sigma_{295}, \sigma_{296}, \sigma_{409}, \sigma_{410}, \sigma_{415}, \sigma_{416}\}$：(1, 3, 2, 4)の巡回置換と(3, 4)の置換と(5, 6)の置換の積，位数16，共役類は計45個

$H_{1383}=\langle\sigma_2, \sigma_{127}, \sigma_{289}\rangle=\{\sigma_1, \sigma_2, \sigma_{127}, \sigma_{128}, \sigma_{289}, \sigma_{290}, \sigma_{415}, \sigma_{416}\}$：{{1, 2, 3, 4, 5, 6}, {2, 1, 4, 3, 5, 6}, {3, 4, 1, 2, 5, 6}, {4, 3, 2, 1, 5, 6}}と(5, 6)の置換の積，位数8，共役類は計15個

$H_{1397}=\langle\sigma_4, \sigma_{26}, \sigma_{122}\rangle=\{\sigma_1, \sigma_4, \sigma_5, \sigma_{26}, \sigma_{27}, \sigma_{30}, \sigma_{122}, \sigma_{123}, \sigma_{126}, \sigma_{145}, \sigma_{148}, \sigma_{149}, \sigma_{241}, \sigma_{244}, \sigma_{245}, \sigma_{266}, \sigma_{267}, \sigma_{270}\}$：(1, 2, 3)の全置換と(4, 5, 6)の全置換の積のうち，偶置換だけを取り出したもの，位数18，共役類は計10個

4個の元から生成される部分群はない。以上より6次対称群の部分群は1455個である。6次対称群の部分群を共役類で分類して下表に示す。この結果は参考文献(2)の4-5頁の表と一致する。

位数	部分群
1	$H_1=\langle\sigma_1\rangle$
2	$H_2=\langle\sigma_2\rangle$, $H_3=\langle\sigma_3\rangle$, $H_5=\langle\sigma_6\rangle$, $H_6=\langle\sigma_7\rangle$, $H_{12}=\langle\sigma_{15}\rangle$, $H_{16}=\langle\sigma_{22}\rangle$, $H_{18}=\langle\sigma_{25}\rangle$, $H_{41}=\langle\sigma_{55}\rangle$, $H_{54}=\langle\sigma_{81}\rangle$, $H_{63}=\langle\sigma_{106}\rangle$, $H_{68}=\langle\sigma_{121}\rangle$, $H_{181}=\langle\sigma_{265}\rangle$, $H_{258}=\langle\sigma_{391}\rangle$, $H_{311}=\langle\sigma_{513}\rangle$, $H_{346}=\langle\sigma_{634}\rangle$
	$H_7=\langle\sigma_8\rangle$, $H_{14}=\langle\sigma_{17}\rangle$, $H_{17}=\langle\sigma_{24}\rangle$, $H_{19}=\langle\sigma_{26}\rangle$, $H_{20}=\langle\sigma_{27}\rangle$, $H_{22}=\langle\sigma_{30}\rangle$, $H_{42}=\langle\sigma_{56}\rangle$, $H_{47}=\langle\sigma_{61}\rangle$, $H_{51}=\langle\sigma_{68}\rangle$, $H_{56}=\langle\sigma_{83}\rangle$, $H_{58}=\langle\sigma_{87}\rangle$, $H_{61}=\langle\sigma_{95}\rangle$, $H_{64}=\langle\sigma_{108}\rangle$, $H_{65}=\langle\sigma_{112}\rangle$, $H_{67}=\langle\sigma_{120}\rangle$, $H_{69}=\langle\sigma_{122}\rangle$, $H_{70}=\langle\sigma_{123}\rangle$, $H_{72}=\langle\sigma_{126}\rangle$, $H_{73}=\langle\sigma_{127}\rangle$, $H_{79}=\langle\sigma_{135}\rangle$, $H_{83}=\langle\sigma_{142}\rangle$, $H_{182}=\langle\sigma_{266}\rangle$, $H_{183}=\langle\sigma_{267}\rangle$, $H_{185}=\langle\sigma_{270}\rangle$, $H_{204}=\langle\sigma_{289}\rangle$, $H_{224}=\langle\sigma_{315}\rangle$, $H_{242}=\langle\sigma_{340}\rangle$, $H_{259}=\langle\sigma_{392}\rangle$, $H_{264}=\langle\sigma_{397}\rangle$, $H_{268}=\langle\sigma_{404}\rangle$, $H_{271}=\langle\sigma_{415}\rangle$, $H_{290}=\langle\sigma_{445}\rangle$, $H_{303}=\langle\sigma_{470}\rangle$, $H_{313}=\langle\sigma_{515}\rangle$, $H_{315}=\langle\sigma_{519}\rangle$, $H_{318}=\langle\sigma_{527}\rangle$, $H_{320}=\langle\sigma_{537}\rangle$, $H_{333}=\langle\sigma_{567}\rangle$, $H_{341}=\langle\sigma_{593}\rangle$, $H_{347}=\langle\sigma_{636}\rangle$, $H_{348}=\langle\sigma_{640}\rangle$, $H_{350}=\langle\sigma_{648}\rangle$, $H_{351}=\langle\sigma_{658}\rangle$, $H_{357}=\langle\sigma_{688}\rangle$, $H_{361}=\langle\sigma_{714}\rangle$
	$H_{74}=\langle\sigma_{128}\rangle$, $H_{81}=\langle\sigma_{137}\rangle$, $H_{84}=\langle\sigma_{144}\rangle$, $H_{205}=\langle\sigma_{290}\rangle$, $H_{226}=\langle\sigma_{317}\rangle$, $H_{243}=\langle\sigma_{342}\rangle$, $H_{272}=\langle\sigma_{416}\rangle$, $H_{294}=\langle\sigma_{451}\rangle$, $H_{306}=\langle\sigma_{476}\rangle$, $H_{322}=\langle\sigma_{539}\rangle$, $H_{336}=\langle\sigma_{573}\rangle$, $H_{344}=\langle\sigma_{599}\rangle$, $H_{352}=\langle\sigma_{660}\rangle$, $H_{359}=\langle\sigma_{694}\rangle$, $H_{362}=\langle\sigma_{720}\rangle$
3	$H_4=\langle\sigma_4\rangle$, $H_8=\langle\sigma_9\rangle$, $H_{11}=\langle\sigma_{12}\rangle$, $H_{13}=\langle\sigma_{16}\rangle$, $H_{23}=\langle\sigma_{31}\rangle$, $H_{31}=\langle\sigma_{39}\rangle$, $H_{38}=\langle\sigma_{46}\rangle$, $H_{43}=\langle\sigma_{57}\rangle$, $H_{46}=\langle\sigma_{60}\rangle$, $H_{55}=\langle\sigma_{82}\rangle$, $H_{85}=\langle\sigma_{145}\rangle$, $H_{115}=\langle\sigma_{175}\rangle$, $H_{141}=\langle\sigma_{201}\rangle$, $H_{166}=\langle\sigma_{226}\rangle$, $H_{186}=\langle\sigma_{271}\rangle$, $H_{194}=\langle\sigma_{279}\rangle$, $H_{201}=\langle\sigma_{286}\rangle$, $H_{260}=\langle\sigma_{393}\rangle$, $H_{263}=\langle\sigma_{396}\rangle$, $H_{312}=\langle\sigma_{514}\rangle$
	$H_{88}=\langle\sigma_{148}\rangle$, $H_{89}=\langle\sigma_{149}\rangle$, $H_{122}=\langle\sigma_{182}\rangle$, $H_{127}=\langle\sigma_{187}\rangle$, $H_{149}=\langle\sigma_{209}\rangle$, $H_{153}=\langle\sigma_{213}\rangle$, $H_{174}=\langle\sigma_{234}\rangle$, $H_{178}=\langle\sigma_{238}\rangle$, $H_{217}=\langle\sigma_{305}\rangle$, $H_{223}=\langle\sigma_{312}\rangle$, $H_{233}=\langle\sigma_{326}\rangle$, $H_{240}=\langle\sigma_{334}\rangle$, $H_{248}=\langle\sigma_{349}\rangle$, $H_{255}=\langle\sigma_{357}\rangle$, $H_{281}=\langle\sigma_{426}\rangle$, $H_{285}=\langle\sigma_{431}\rangle$, $H_{289}=\langle\sigma_{444}\rangle$, $H_{301}=\langle\sigma_{467}\rangle$, $H_{325}=\langle\sigma_{544}\rangle$, $H_{331}=\langle\sigma_{562}\rangle$
4	$H_9=\langle\sigma_{10}\rangle$, $H_{10}=\langle\sigma_{11}\rangle$, $H_{15}=\langle\sigma_{18}\rangle$, $H_{25}=\langle\sigma_{33}\rangle$, $H_{28}=\langle\sigma_{36}\rangle$, $H_{29}=\langle\sigma_{37}\rangle$, $H_{32}=\langle\sigma_{40}\rangle$, $H_{36}=\langle\sigma_{44}\rangle$, $H_{37}=\langle\sigma_{45}\rangle$, $H_{44}=\langle\sigma_{58}\rangle$, $H_{45}=\langle\sigma_{59}\rangle$, $H_{49}=\langle\sigma_{63}\rangle$, $H_{52}=\langle\sigma_{70}\rangle$, $H_{57}=\langle\sigma_{84}\rangle$, $H_{62}=\langle\sigma_{96}\rangle$, $H_{91}=\langle\sigma_{151}\rangle$, $H_{99}=\langle\sigma_{159}\rangle$, $H_{106}=\langle\sigma_{166}\rangle$, $H_{109}=\langle\sigma_{169}\rangle$, $H_{117}=\langle\sigma_{177}\rangle$, $H_{120}=\langle\sigma_{180}\rangle$, $H_{135}=\langle\sigma_{195}\rangle$, $H_{139}=\langle\sigma_{199}\rangle$, $H_{142}=\langle\sigma_{202}\rangle$, $H_{160}=\langle\sigma_{220}\rangle$, $H_{164}=\langle\sigma_{224}\rangle$, $H_{165}=\langle\sigma_{225}\rangle$, $H_{188}=\langle\sigma_{273}\rangle$, $H_{191}=\langle\sigma_{276}\rangle$, $H_{192}=\langle\sigma_{277}\rangle$, $H_{195}=\langle\sigma_{280}\rangle$, $H_{199}=\langle\sigma_{284}\rangle$, $H_{200}=\langle\sigma_{285}\rangle$, $H_{210}=\langle\sigma_{295}\rangle$, $H_{229}=\langle\sigma_{321}\rangle$, $H_{245}=\langle\sigma_{346}\rangle$, $H_{261}=\langle\sigma_{394}\rangle$, $H_{262}=\langle\sigma_{395}\rangle$, $H_{266}=\langle\sigma_{399}\rangle$, $H_{269}=\langle\sigma_{406}\rangle$, $H_{292}=\langle\sigma_{447}\rangle$, $H_{304}=\langle\sigma_{472}\rangle$, $H_{314}=\langle\sigma_{516}\rangle$, $H_{319}=\langle\sigma_{528}\rangle$, $H_{342}=\langle\sigma_{594}\rangle$
	$H_{76}=\langle\sigma_{130}\rangle$, $H_{77}=\langle\sigma_{131}\rangle$, $H_{82}=\langle\sigma_{138}\rangle$, $H_{92}=\langle\sigma_{152}\rangle$, $H_{101}=\langle\sigma_{161}\rangle$, $H_{108}=\langle\sigma_{168}\rangle$, $H_{110}=\langle\sigma_{170}\rangle$, $H_{126}=\langle\sigma_{186}\rangle$, $H_{131}=\langle\sigma_{191}\rangle$, $H_{137}=\langle\sigma_{197}\rangle$, $H_{148}=\langle\sigma_{208}\rangle$, $H_{152}=\langle\sigma_{212}\rangle$, $H_{162}=\langle\sigma_{222}\rangle$, $H_{171}=\langle\sigma_{231}\rangle$, $H_{175}=\langle\sigma_{235}\rangle$, $H_{207}=\langle\sigma_{292}\rangle$, $H_{208}=\langle\sigma_{293}\rangle$, $H_{211}=\langle\sigma_{296}\rangle$, $H_{216}=\langle\sigma_{304}\rangle$, $H_{220}=\langle\sigma_{309}\rangle$, $H_{227}=\langle\sigma_{318}\rangle$, $H_{230}=\langle\sigma_{323}\rangle$, $H_{236}=\langle\sigma_{330}\rangle$, $H_{237}=\langle\sigma_{331}\rangle$, $H_{247}=\langle\sigma_{348}\rangle$, $H_{251}=\langle\sigma_{353}\rangle$, $H_{254}=\langle\sigma_{356}\rangle$, $H_{274}=\langle\sigma_{418}\rangle$, $H_{275}=\langle\sigma_{419}\rangle$, $H_{278}=\langle\sigma_{422}\rangle$, $H_{282}=\langle\sigma_{427}\rangle$, $H_{295}=\langle\sigma_{452}\rangle$, $H_{296}=\langle\sigma_{453}\rangle$, $H_{299}=\langle\sigma_{456}\rangle$, $H_{308}=\langle\sigma_{478}\rangle$, $H_{309}=\langle\sigma_{479}\rangle$, $H_{323}=\langle\sigma_{540}\rangle$, $H_{326}=\langle\sigma_{545}\rangle$, $H_{328}=\langle\sigma_{549}\rangle$, $H_{337}=\langle\sigma_{574}\rangle$, $H_{338}=\langle\sigma_{575}\rangle$, $H_{345}=\langle\sigma_{600}\rangle$, $H_{354}=\langle\sigma_{666}\rangle$, $H_{355}=\langle\sigma_{670}\rangle$, $H_{360}=\langle\sigma_{696}\rangle$
	$H_{364}=\langle\sigma_2, \sigma_7\rangle$, $H_{368}=\langle\sigma_2, \sigma_{25}\rangle$, $H_{372}=\langle\sigma_2, \sigma_{55}\rangle$, $H_{379}=\langle\sigma_2, \sigma_{121}\rangle$, $H_{398}=\langle\sigma_2, \sigma_{265}\rangle$, $H_{411}=\langle\sigma_2, \sigma_{391}\rangle$, $H_{433}=\langle\sigma_3, \sigma_{22}\rangle$, $H_{434}=\langle\sigma_3, \sigma_{25}\rangle$, $H_{440}=\langle\sigma_3, \sigma_{106}\rangle$, $H_{442}=\langle\sigma_3, \sigma_{121}\rangle$, $H_{456}=\langle\sigma_3, \sigma_{265}\rangle$, $H_{477}=\langle\sigma_3, \sigma_{634}\rangle$, $H_{505}=\langle\sigma_6, \sigma_{15}\rangle$, $H_{506}=\langle\sigma_6, \sigma_{25}\rangle$, $H_{512}=\langle\sigma_6, \sigma_{81}\rangle$, $H_{514}=\langle\sigma_6, \sigma_{121}\rangle$, $H_{528}=\langle\sigma_6, \sigma_{265}\rangle$, $H_{549}=\langle\sigma_6, \sigma_{513}\rangle$, $H_{559}=\langle\sigma_7, \sigma_{81}\rangle$, $H_{560}=\langle\sigma_7, \sigma_{106}\rangle$, $H_{561}=\langle\sigma_7, \sigma_{121}\rangle$, $H_{580}=\langle\sigma_7, \sigma_{513}\rangle$, $H_{586}=\langle\sigma_7, \sigma_{634}\rangle$, $H_{687}=\langle\sigma_{15}, \sigma_{55}\rangle$, $H_{688}=\langle\sigma_{15}, \sigma_{106}\rangle$, $H_{689}=\langle\sigma_{15}, \sigma_{121}\rangle$, $H_{708}=\langle\sigma_{15}, \sigma_{391}\rangle$, $H_{714}=\langle\sigma_{15}, \sigma_{634}\rangle$, $H_{776}=\langle\sigma_{22}, \sigma_{55}\rangle$, $H_{777}=\langle\sigma_{22}, \sigma_{81}\rangle$, $H_{778}=\langle\sigma_{22}, \sigma_{121}\rangle$, $H_{797}=\langle\sigma_{22}, \sigma_{391}\rangle$, $H_{803}=\langle\sigma_{22}, \sigma_{513}\rangle$, $H_{852}=\langle\sigma_{25}, \sigma_{391}\rangle$, $H_{856}=\langle\sigma_{25}, \sigma_{513}\rangle$, $H_{859}=\langle\sigma_{25}, \sigma_{634}\rangle$, $H_{1012}=\langle\sigma_{55}, \sigma_{265}\rangle$, $H_{1016}=\langle\sigma_{55}, \sigma_{513}\rangle$, $H_{1019}=\langle\sigma_{55}, \sigma_{634}\rangle$, $H_{1139}=\langle\sigma_{81}, \sigma_{265}\rangle$, $H_{1143}=\langle\sigma_{81}, \sigma_{391}\rangle$, $H_{1146}=\langle\sigma_{81}, \sigma_{634}\rangle$, $H_{1240}=\langle\sigma_{106}, \sigma_{265}\rangle$, $H_{1244}=\langle\sigma_{106}, \sigma_{391}\rangle$, $H_{1247}=\langle\sigma_{106}, \sigma_{513}\rangle$
	$H_{381}=\langle\sigma_2, \sigma_{127}\rangle$, $H_{402}=\langle\sigma_2, \sigma_{289}\rangle$, $H_{414}=\langle\sigma_2, \sigma_{415}\rangle$, $H_{445}=\langle\sigma_3, \sigma_{142}\rangle$, $H_{462}=\langle\sigma_3, \sigma_{340}\rangle$, $H_{479}=\langle\sigma_3, \sigma_{658}\rangle$, $H_{517}=\langle\sigma_6, \sigma_{135}\rangle$, $H_{534}=\langle\sigma_6, \sigma_{315}\rangle$, $H_{551}=\langle\sigma_6, \sigma_{537}\rangle$, $H_{562}=\langle\sigma_7, \sigma_{122}\rangle$, $H_{584}=\langle\sigma_7, \sigma_{593}\rangle$, $H_{589}=\langle\sigma_7, \sigma_{714}\rangle$, $H_{597}=\langle\sigma_8, \sigma_{121}\rangle$, $H_{690}=\langle\sigma_{15}, \sigma_{126}\rangle$, $H_{712}=\langle\sigma_{15}, \sigma_{470}\rangle$, $H_{717}=\langle\sigma_{15}, \sigma_{688}\rangle$, $H_{736}=\langle\sigma_{17}, \sigma_{121}\rangle$, $H_{779}=\langle\sigma_{22}, \sigma_{123}\rangle$, $H_{801}=\langle\sigma_{22}, \sigma_{445}\rangle$, $H_{806}=\langle\sigma_{22}, \sigma_{567}\rangle$, $H_{811}=\langle\sigma_{24}, \sigma_{121}\rangle$, $H_{853}=\langle\sigma_{25}, \sigma_{392}\rangle$, $H_{857}=\langle\sigma_{25}, \sigma_{515}\rangle$, $H_{860}=\langle\sigma_{25}, \sigma_{636}\rangle$, $H_{879}=\langle\sigma_{26}, \sigma_{391}\rangle$, $H_{916}=\langle\sigma_{27}, \sigma_{634}\rangle$, $H_{945}=\langle\sigma_{30}, \sigma_{513}\rangle$, $H_{1013}=\langle\sigma_{55}, \sigma_{266}\rangle$, $H_{1017}=\langle\sigma_{55}, \sigma_{527}\rangle$, $H_{1020}=\langle\sigma_{55}, \sigma_{648}\rangle$, $H_{1039}=\langle\sigma_{56}, \sigma_{265}\rangle$, $H_{1095}=\langle\sigma_{61}, \sigma_{634}\rangle$, $H_{1121}=\langle\sigma_{68}, \sigma_{513}\rangle$, $H_{1140}=\langle\sigma_{81}, \sigma_{270}\rangle$, $H_{1144}=\langle\sigma_{81}, \sigma_{404}\rangle$, $H_{1147}=\langle\sigma_{81}, \sigma_{640}\rangle$, $H_{1168}=\langle\sigma_{83}, \sigma_{265}\rangle$, $H_{1200}=\langle\sigma_{87}, \sigma_{634}\rangle$, $H_{1222}=\langle\sigma_{95}, \sigma_{391}\rangle$, $H_{1241}=\langle\sigma_{106}, \sigma_{267}\rangle$, $H_{1245}=\langle\sigma_{106}, \sigma_{397}\rangle$, $H_{1248}=\langle\sigma_{106}, \sigma_{519}\rangle$, $H_{1260}=\langle\sigma_{108}, \sigma_{265}\rangle$, $H_{1288}=\langle\sigma_{112}, \sigma_{513}\rangle$, $H_{1308}=\langle\sigma_{120}, \sigma_{391}\rangle$

位数	部分群
4	$H_{590}=\langle\sigma_8, \sigma_{17}\rangle$, $H_{861}=\langle\sigma_{26}, \sigma_{95}\rangle$, $H_{892}=\langle\sigma_{27}, \sigma_{61}\rangle$, $H_{921}=\langle\sigma_{30}, \sigma_{68}\rangle$, $H_{1021}=\langle\sigma_{56}, \sigma_{83}\rangle$, $H_{1311}=\langle\sigma_{122}, \sigma_{593}\rangle$, $H_{1313}=\langle\sigma_{123}, \sigma_{445}\rangle$, $H_{1315}=\langle\sigma_{126}, \sigma_{470}\rangle$, $H_{1317}=\langle\sigma_{127}, \sigma_{289}\rangle$, $H_{1327}=\langle\sigma_{135}, \sigma_{315}\rangle$, $H_{1337}=\langle\sigma_{142}, \sigma_{340}\rangle$, $H_{1355}=\langle\sigma_{266}, \sigma_{527}\rangle$, $H_{1357}=\langle\sigma_{267}, \sigma_{397}\rangle$, $H_{1359}=\langle\sigma_{270}, \sigma_{404}\rangle$, $H_{1367}=\langle\sigma_{392}, \sigma_{515}\rangle$
	$H_{598}=\langle\sigma_8, \sigma_{122}\rangle$, $H_{738}=\langle\sigma_{17}, \sigma_{126}\rangle$, $H_{812}=\langle\sigma_{24}, \sigma_{123}\rangle$, $H_{880}=\langle\sigma_{26}, \sigma_{392}\rangle$, $H_{917}=\langle\sigma_{27}, \sigma_{636}\rangle$, $H_{946}=\langle\sigma_{30}, \sigma_{515}\rangle$, $H_{1040}=\langle\sigma_{56}, \sigma_{266}\rangle$, $H_{1097}=\langle\sigma_{61}, \sigma_{648}\rangle$, $H_{1123}=\langle\sigma_{68}, \sigma_{527}\rangle$, $H_{1170}=\langle\sigma_{83}, \sigma_{270}\rangle$, $H_{1201}=\langle\sigma_{87}, \sigma_{640}\rangle$, $H_{1224}=\langle\sigma_{95}, \sigma_{404}\rangle$, $H_{1261}=\langle\sigma_{108}, \sigma_{267}\rangle$, $H_{1289}=\langle\sigma_{112}, \sigma_{519}\rangle$, $H_{1309}=\langle\sigma_{120}, \sigma_{397}\rangle$
	$H_{601}=\langle\sigma_8, \sigma_{137}\rangle$, $H_{739}=\langle\sigma_{17}, \sigma_{128}\rangle$, $H_{813}=\langle\sigma_{24}, \sigma_{128}\rangle$, $H_{883}=\langle\sigma_{26}, \sigma_{451}\rangle$, $H_{920}=\langle\sigma_{27}, \sigma_{694}\rangle$, $H_{949}=\langle\sigma_{30}, \sigma_{573}\rangle$, $H_{1043}=\langle\sigma_{56}, \sigma_{317}\rangle$, $H_{1098}=\langle\sigma_{61}, \sigma_{660}\rangle$, $H_{1124}=\langle\sigma_{68}, \sigma_{539}\rangle$, $H_{1171}=\langle\sigma_{83}, \sigma_{290}\rangle$, $H_{1202}=\langle\sigma_{87}, \sigma_{660}\rangle$, $H_{1225}=\langle\sigma_{95}, \sigma_{416}\rangle$, $H_{1262}=\langle\sigma_{108}, \sigma_{290}\rangle$, $H_{1290}=\langle\sigma_{112}, \sigma_{539}\rangle$, $H_{1310}=\langle\sigma_{120}, \sigma_{416}\rangle$, $H_{1312}=\langle\sigma_{122}, \sigma_{599}\rangle$, $H_{1314}=\langle\sigma_{123}, \sigma_{451}\rangle$, $H_{1316}=\langle\sigma_{126}, \sigma_{476}\rangle$, $H_{1318}=\langle\sigma_{127}, \sigma_{290}\rangle$, $H_{1319}=\langle\sigma_{128}, \sigma_{289}\rangle$, $H_{1320}=\langle\sigma_{128}, \sigma_{290}\rangle$, $H_{1325}=\langle\sigma_{128}, \sigma_{593}\rangle$, $H_{1326}=\langle\sigma_{128}, \sigma_{599}\rangle$, $H_{1328}=\langle\sigma_{135}, \sigma_{317}\rangle$, $H_{1331}=\langle\sigma_{137}, \sigma_{315}\rangle$, $H_{1332}=\langle\sigma_{137}, \sigma_{317}\rangle$, $H_{1335}=\langle\sigma_{137}, \sigma_{470}\rangle$, $H_{1336}=\langle\sigma_{137}, \sigma_{476}\rangle$, $H_{1338}=\langle\sigma_{142}, \sigma_{342}\rangle$, $H_{1343}=\langle\sigma_{144}, \sigma_{340}\rangle$, $H_{1344}=\langle\sigma_{144}, \sigma_{342}\rangle$, $H_{1345}=\langle\sigma_{144}, \sigma_{445}\rangle$, $H_{1346}=\langle\sigma_{144}, \sigma_{451}\rangle$, $H_{1356}=\langle\sigma_{266}, \sigma_{573}\rangle$, $H_{1358}=\langle\sigma_{267}, \sigma_{476}\rangle$, $H_{1360}=\langle\sigma_{270}, \sigma_{451}\rangle$, $H_{1361}=\langle\sigma_{290}, \sigma_{527}\rangle$, $H_{1362}=\langle\sigma_{290}, \sigma_{573}\rangle$, $H_{1363}=\langle\sigma_{317}, \sigma_{404}\rangle$, $H_{1364}=\langle\sigma_{317}, \sigma_{451}\rangle$, $H_{1365}=\langle\sigma_{342}, \sigma_{397}\rangle$, $H_{1366}=\langle\sigma_{342}, \sigma_{476}\rangle$, $H_{1368}=\langle\sigma_{392}, \sigma_{539}\rangle$, $H_{1369}=\langle\sigma_{416}, \sigma_{515}\rangle$, $H_{1370}=\langle\sigma_{416}, \sigma_{539}\rangle$
5	$H_{26}=\langle\sigma_{34}\rangle$, $H_{27}=\langle\sigma_{35}\rangle$, $H_{30}=\langle\sigma_{38}\rangle$, $H_{34}=\langle\sigma_{42}\rangle$, $H_{35}=\langle\sigma_{43}\rangle$, $H_{39}=\langle\sigma_{47}\rangle$, $H_{93}=\langle\sigma_{153}\rangle$, $H_{96}=\langle\sigma_{156}\rangle$, $H_{97}=\langle\sigma_{157}\rangle$, $H_{100}=\langle\sigma_{160}\rangle$, $H_{104}=\langle\sigma_{164}\rangle$, $H_{105}=\langle\sigma_{165}\rangle$, $H_{111}=\langle\sigma_{171}\rangle$, $H_{114}=\langle\sigma_{174}\rangle$, $H_{118}=\langle\sigma_{178}\rangle$, $H_{119}=\langle\sigma_{179}\rangle$, $H_{123}=\langle\sigma_{183}\rangle$, $H_{130}=\langle\sigma_{190}\rangle$, $H_{133}=\langle\sigma_{193}\rangle$, $H_{136}=\langle\sigma_{196}\rangle$, $H_{140}=\langle\sigma_{200}\rangle$, $H_{144}=\langle\sigma_{204}\rangle$, $H_{145}=\langle\sigma_{205}\rangle$, $H_{156}=\langle\sigma_{216}\rangle$, $H_{158}=\langle\sigma_{218}\rangle$, $H_{159}=\langle\sigma_{219}\rangle$, $H_{163}=\langle\sigma_{223}\rangle$, $H_{167}=\langle\sigma_{227}\rangle$, $H_{170}=\langle\sigma_{230}\rangle$, $H_{179}=\langle\sigma_{239}\rangle$, $H_{189}=\langle\sigma_{274}\rangle$, $H_{190}=\langle\sigma_{275}\rangle$, $H_{193}=\langle\sigma_{278}\rangle$, $H_{197}=\langle\sigma_{282}\rangle$, $H_{198}=\langle\sigma_{283}\rangle$, $H_{202}=\langle\sigma_{287}\rangle$
6	$H_{21}=\langle\sigma_{28}\rangle$, $H_{24}=\langle\sigma_{32}\rangle$, $H_{33}=\langle\sigma_{41}\rangle$, $H_{40}=\langle\sigma_{48}\rangle$, $H_{48}=\langle\sigma_{62}\rangle$, $H_{50}=\langle\sigma_{66}\rangle$, $H_{53}=\langle\sigma_{71}\rangle$, $H_{59}=\langle\sigma_{88}\rangle$, $H_{60}=\langle\sigma_{89}\rangle$, $H_{66}=\langle\sigma_{114}\rangle$, $H_{71}=\langle\sigma_{124}\rangle$, $H_{75}=\langle\sigma_{129}\rangle$, $H_{78}=\langle\sigma_{132}\rangle$, $H_{80}=\langle\sigma_{136}\rangle$, $H_{86}=\langle\sigma_{146}\rangle$, $H_{87}=\langle\sigma_{147}\rangle$, $H_{90}=\langle\sigma_{150}\rangle$, $H_{116}=\langle\sigma_{176}\rangle$, $H_{121}=\langle\sigma_{181}\rangle$, $H_{128}=\langle\sigma_{188}\rangle$, $H_{143}=\langle\sigma_{203}\rangle$, $H_{147}=\langle\sigma_{207}\rangle$, $H_{155}=\langle\sigma_{215}\rangle$, $H_{168}=\langle\sigma_{228}\rangle$, $H_{172}=\langle\sigma_{232}\rangle$, $H_{180}=\langle\sigma_{240}\rangle$, $H_{184}=\langle\sigma_{268}\rangle$, $H_{187}=\langle\sigma_{272}\rangle$, $H_{196}=\langle\sigma_{281}\rangle$, $H_{203}=\langle\sigma_{288}\rangle$, $H_{206}=\langle\sigma_{291}\rangle$, $H_{209}=\langle\sigma_{294}\rangle$, $H_{215}=\langle\sigma_{303}\rangle$, $H_{221}=\langle\sigma_{310}\rangle$, $H_{225}=\langle\sigma_{316}\rangle$, $H_{232}=\langle\sigma_{325}\rangle$, $H_{241}=\langle\sigma_{336}\rangle$, $H_{249}=\langle\sigma_{350}\rangle$, $H_{257}=\langle\sigma_{359}\rangle$, $H_{265}=\langle\sigma_{398}\rangle$, $H_{267}=\langle\sigma_{402}\rangle$, $H_{270}=\langle\sigma_{407}\rangle$, $H_{273}=\langle\sigma_{417}\rangle$, $H_{276}=\langle\sigma_{420}\rangle$, $H_{277}=\langle\sigma_{421}\rangle$, $H_{283}=\langle\sigma_{428}\rangle$, $H_{291}=\langle\sigma_{446}\rangle$, $H_{293}=\langle\sigma_{450}\rangle$, $H_{305}=\langle\sigma_{473}\rangle$, $H_{316}=\langle\sigma_{520}\rangle$, $H_{317}=\langle\sigma_{521}\rangle$, $H_{321}=\langle\sigma_{538}\rangle$, $H_{324}=\langle\sigma_{543}\rangle$, $H_{330}=\langle\sigma_{551}\rangle$, $H_{334}=\langle\sigma_{568}\rangle$, $H_{335}=\langle\sigma_{569}\rangle$, $H_{349}=\langle\sigma_{642}\rangle$, $H_{353}=\langle\sigma_{664}\rangle$, $H_{356}=\langle\sigma_{672}\rangle$, $H_{358}=\langle\sigma_{690}\rangle$
	$H_{94}=\langle\sigma_{154}\rangle$, $H_{95}=\langle\sigma_{155}\rangle$, $H_{98}=\langle\sigma_{158}\rangle$, $H_{102}=\langle\sigma_{162}\rangle$, $H_{103}=\langle\sigma_{163}\rangle$, $H_{107}=\langle\sigma_{167}\rangle$, $H_{112}=\langle\sigma_{172}\rangle$, $H_{113}=\langle\sigma_{173}\rangle$, $H_{124}=\langle\sigma_{184}\rangle$, $H_{125}=\langle\sigma_{185}\rangle$, $H_{129}=\langle\sigma_{189}\rangle$, $H_{132}=\langle\sigma_{192}\rangle$, $H_{134}=\langle\sigma_{194}\rangle$, $H_{138}=\langle\sigma_{198}\rangle$, $H_{146}=\langle\sigma_{206}\rangle$, $H_{150}=\langle\sigma_{210}\rangle$, $H_{151}=\langle\sigma_{211}\rangle$, $H_{154}=\langle\sigma_{214}\rangle$, $H_{157}=\langle\sigma_{217}\rangle$, $H_{161}=\langle\sigma_{221}\rangle$, $H_{169}=\langle\sigma_{229}\rangle$, $H_{173}=\langle\sigma_{233}\rangle$, $H_{176}=\langle\sigma_{236}\rangle$, $H_{177}=\langle\sigma_{237}\rangle$, $H_{212}=\langle\sigma_{298}\rangle$, $H_{213}=\langle\sigma_{299}\rangle$, $H_{214}=\langle\sigma_{302}\rangle$, $H_{218}=\langle\sigma_{306}\rangle$, $H_{219}=\langle\sigma_{307}\rangle$, $H_{222}=\langle\sigma_{311}\rangle$, $H_{228}=\langle\sigma_{320}\rangle$, $H_{231}=\langle\sigma_{324}\rangle$, $H_{234}=\langle\sigma_{328}\rangle$, $H_{235}=\langle\sigma_{329}\rangle$, $H_{238}=\langle\sigma_{332}\rangle$, $H_{239}=\langle\sigma_{333}\rangle$, $H_{244}=\langle\sigma_{343}\rangle$, $H_{246}=\langle\sigma_{347}\rangle$, $H_{250}=\langle\sigma_{351}\rangle$, $H_{252}=\langle\sigma_{354}\rangle$, $H_{253}=\langle\sigma_{355}\rangle$, $H_{256}=\langle\sigma_{358}\rangle$, $H_{279}=\langle\sigma_{424}\rangle$, $H_{280}=\langle\sigma_{425}\rangle$, $H_{284}=\langle\sigma_{429}\rangle$, $H_{286}=\langle\sigma_{432}\rangle$, $H_{287}=\langle\sigma_{442}\rangle$, $H_{288}=\langle\sigma_{443}\rangle$, $H_{297}=\langle\sigma_{454}\rangle$, $H_{298}=\langle\sigma_{455}\rangle$, $H_{300}=\langle\sigma_{465}\rangle$, $H_{302}=\langle\sigma_{468}\rangle$, $H_{307}=\langle\sigma_{477}\rangle$, $H_{310}=\langle\sigma_{480}\rangle$, $H_{327}=\langle\sigma_{546}\rangle$, $H_{329}=\langle\sigma_{550}\rangle$, $H_{332}=\langle\sigma_{564}\rangle$, $H_{339}=\langle\sigma_{576}\rangle$, $H_{340}=\langle\sigma_{586}\rangle$, $H_{343}=\langle\sigma_{598}\rangle$
	$H_{363}=\langle\sigma_2, \sigma_3\rangle$, $H_{366}=\langle\sigma_2, \sigma_{15}\rangle$, $H_{375}=\langle\sigma_2, \sigma_{81}\rangle$, $H_{420}=\langle\sigma_2, \sigma_{513}\rangle$, $H_{431}=\langle\sigma_3, \sigma_7\rangle$, $H_{436}=\langle\sigma_3, \sigma_{55}\rangle$, $H_{466}=\langle\sigma_3, \sigma_{391}\rangle$, $H_{503}=\langle\sigma_6, \sigma_7\rangle$, $H_{508}=\langle\sigma_6, \sigma_{55}\rangle$, $H_{538}=\langle\sigma_6, \sigma_{391}\rangle$, $H_{555}=\langle\sigma_7, \sigma_{25}\rangle$, $H_{569}=\langle\sigma_7, \sigma_{265}\rangle$, $H_{683}=\langle\sigma_{15}, \sigma_{25}\rangle$, $H_{697}=\langle\sigma_{15}, \sigma_{265}\rangle$, $H_{772}=\langle\sigma_{22}, \sigma_{25}\rangle$, $H_{786}=\langle\sigma_{22}, \sigma_{265}\rangle$, $H_{841}=\langle\sigma_{25}, \sigma_{121}\rangle$, $H_{1001}=\langle\sigma_{55}, \sigma_{121}\rangle$, $H_{1128}=\langle\sigma_{81}, \sigma_{121}\rangle$, $H_{1229}=\langle\sigma_{106}, \sigma_{121}\rangle$

位数	部分群
6	$H_{484}=\langle\sigma_4, \sigma_{26}\rangle$, $H_{487}=\langle\sigma_4, \sigma_{122}\rangle$, $H_{493}=\langle\sigma_4, \sigma_{266}\rangle$, $H_{591}=\langle\sigma_8, \sigma_{26}\rangle$, $H_{596}=\langle\sigma_8, \sigma_{82}\rangle$, $H_{612}=\langle\sigma_8, \sigma_{266}\rangle$, $H_{629}=\langle\sigma_8, \sigma_{514}\rangle$, $H_{638}=\langle\sigma_9, \sigma_{108}\rangle$, $H_{639}=\langle\sigma_9, \sigma_{123}\rangle$, $H_{648}=\langle\sigma_9, \sigma_{636}\rangle$, $H_{670}=\langle\sigma_{12}, \sigma_{83}\rangle$, $H_{671}=\langle\sigma_{12}, \sigma_{126}\rangle$, $H_{680}=\langle\sigma_{12}, \sigma_{515}\rangle$, $H_{719}=\langle\sigma_{16}, \sigma_{56}\rangle$, $H_{720}=\langle\sigma_{16}, \sigma_{122}\rangle$, $H_{729}=\langle\sigma_{16}, \sigma_{392}\rangle$, $H_{734}=\langle\sigma_{17}, \sigma_{30}\rangle$, $H_{735}=\langle\sigma_{17}, \sigma_{60}\rangle$, $H_{750}=\langle\sigma_{17}, \sigma_{270}\rangle$, $H_{761}=\langle\sigma_{17}, \sigma_{396}\rangle$, $H_{808}=\langle\sigma_{24}, \sigma_{27}\rangle$, $H_{810}=\langle\sigma_{24}, \sigma_{57}\rangle$, $H_{823}=\langle\sigma_{24}, \sigma_{267}\rangle$, $H_{833}=\langle\sigma_{24}, \sigma_{393}\rangle$, $H_{862}=\langle\sigma_{26}, \sigma_{122}\rangle$, $H_{885}=\langle\sigma_{26}, \sigma_{514}\rangle$, $H_{894}=\langle\sigma_{27}, \sigma_{123}\rangle$, $H_{910}=\langle\sigma_{27}, \sigma_{393}\rangle$, $H_{924}=\langle\sigma_{30}, \sigma_{126}\rangle$, $H_{940}=\langle\sigma_{30}, \sigma_{396}\rangle$, $H_{955}=\langle\sigma_{31}, \sigma_{519}\rangle$, $H_{956}=\langle\sigma_{31}, \sigma_{640}\rangle$, $H_{977}=\langle\sigma_{39}, \sigma_{397}\rangle$, $H_{978}=\langle\sigma_{39}, \sigma_{648}\rangle$, $H_{999}=\langle\sigma_{46}, \sigma_{404}\rangle$, $H_{1000}=\langle\sigma_{46}, \sigma_{527}\rangle$, $H_{1022}=\langle\sigma_{56}, \sigma_{122}\rangle$, $H_{1045}=\langle\sigma_{56}, \sigma_{514}\rangle$, $H_{1056}=\langle\sigma_{57}, \sigma_{267}\rangle$, $H_{1058}=\langle\sigma_{57}, \sigma_{636}\rangle$, $H_{1073}=\langle\sigma_{60}, \sigma_{270}\rangle$, $H_{1075}=\langle\sigma_{60}, \sigma_{515}\rangle$, $H_{1081}=\langle\sigma_{61}, \sigma_{135}\rangle$, $H_{1090}=\langle\sigma_{61}, \sigma_{279}\rangle$, $H_{1109}=\langle\sigma_{68}, \sigma_{142}\rangle$, $H_{1117}=\langle\sigma_{68}, \sigma_{286}\rangle$, $H_{1152}=\langle\sigma_{82}, \sigma_{266}\rangle$, $H_{1154}=\langle\sigma_{82}, \sigma_{392}\rangle$, $H_{1157}=\langle\sigma_{83}, \sigma_{126}\rangle$, $H_{1173}=\langle\sigma_{83}, \sigma_{396}\rangle$, $H_{1186}=\langle\sigma_{87}, \sigma_{127}\rangle$, $H_{1195}=\langle\sigma_{87}, \sigma_{271}\rangle$, $H_{1210}=\langle\sigma_{95}, \sigma_{142}\rangle$, $H_{1218}=\langle\sigma_{95}, \sigma_{286}\rangle$, $H_{1250}=\langle\sigma_{108}, \sigma_{123}\rangle$, $H_{1264}=\langle\sigma_{108}, \sigma_{393}\rangle$, $H_{1274}=\langle\sigma_{112}, \sigma_{127}\rangle$, $H_{1283}=\langle\sigma_{112}, \sigma_{271}\rangle$, $H_{1296}=\langle\sigma_{120}, \sigma_{135}\rangle$, $H_{1304}=\langle\sigma_{120}, \sigma_{279}\rangle$
	$H_{620}=\langle\sigma_8, \sigma_{315}\rangle$, $H_{625}=\langle\sigma_8, \sigma_{340}\rangle$, $H_{630}=\langle\sigma_8, \sigma_{537}\rangle$, $H_{633}=\langle\sigma_8, \sigma_{562}\rangle$, $H_{751}=\langle\sigma_{17}, \sigma_{289}\rangle$, $H_{759}=\langle\sigma_{17}, \sigma_{340}\rangle$, $H_{762}=\langle\sigma_{17}, \sigma_{415}\rangle$, $H_{766}=\langle\sigma_{17}, \sigma_{444}\rangle$, $H_{825}=\langle\sigma_{24}, \sigma_{289}\rangle$, $H_{828}=\langle\sigma_{24}, \sigma_{315}\rangle$, $H_{834}=\langle\sigma_{24}, \sigma_{415}\rangle$, $H_{840}=\langle\sigma_{24}, \sigma_{467}\rangle$, $H_{863}=\langle\sigma_{26}, \sigma_{123}\rangle$, $H_{865}=\langle\sigma_{26}, \sigma_{126}\rangle$, $H_{888}=\langle\sigma_{26}, \sigma_{519}\rangle$, $H_{889}=\langle\sigma_{26}, \sigma_{544}\rangle$, $H_{893}=\langle\sigma_{27}, \sigma_{122}\rangle$, $H_{895}=\langle\sigma_{27}, \sigma_{126}\rangle$, $H_{912}=\langle\sigma_{27}, \sigma_{404}\rangle$, $H_{913}=\langle\sigma_{27}, \sigma_{431}\rangle$, $H_{922}=\langle\sigma_{30}, \sigma_{122}\rangle$, $H_{923}=\langle\sigma_{30}, \sigma_{123}\rangle$, $H_{941}=\langle\sigma_{30}, \sigma_{397}\rangle$, $H_{942}=\langle\sigma_{30}, \sigma_{426}\rangle$, $H_{1027}=\langle\sigma_{56}, \sigma_{135}\rangle$, $H_{1030}=\langle\sigma_{56}, \sigma_{142}\rangle$, $H_{1046}=\langle\sigma_{56}, \sigma_{519}\rangle$, $H_{1049}=\langle\sigma_{56}, \sigma_{537}\rangle$, $H_{1076}=\langle\sigma_{61}, \sigma_{122}\rangle$, $H_{1083}=\langle\sigma_{61}, \sigma_{142}\rangle$, $H_{1089}=\langle\sigma_{61}, \sigma_{270}\rangle$, $H_{1092}=\langle\sigma_{61}, \sigma_{305}\rangle$, $H_{1102}=\langle\sigma_{68}, \sigma_{122}\rangle$, $H_{1107}=\langle\sigma_{68}, \sigma_{135}\rangle$, $H_{1115}=\langle\sigma_{68}, \sigma_{267}\rangle$, $H_{1118}=\langle\sigma_{68}, \sigma_{312}\rangle$, $H_{1158}=\langle\sigma_{83}, \sigma_{127}\rangle$, $H_{1163}=\langle\sigma_{83}, \sigma_{142}\rangle$, $H_{1174}=\langle\sigma_{83}, \sigma_{397}\rangle$, $H_{1177}=\langle\sigma_{83}, \sigma_{415}\rangle$, $H_{1185}=\langle\sigma_{87}, \sigma_{126}\rangle$, $H_{1190}=\langle\sigma_{87}, \sigma_{142}\rangle$, $H_{1193}=\langle\sigma_{87}, \sigma_{266}\rangle$, $H_{1199}=\langle\sigma_{87}, \sigma_{326}\rangle$, $H_{1205}=\langle\sigma_{95}, \sigma_{126}\rangle$, $H_{1206}=\langle\sigma_{95}, \sigma_{127}\rangle$, $H_{1215}=\langle\sigma_{95}, \sigma_{267}\rangle$, $H_{1219}=\langle\sigma_{95}, \sigma_{289}\rangle$, $H_{1252}=\langle\sigma_{108}, \sigma_{127}\rangle$, $H_{1255}=\langle\sigma_{108}, \sigma_{135}\rangle$, $H_{1267}=\langle\sigma_{108}, \sigma_{404}\rangle$, $H_{1268}=\langle\sigma_{108}, \sigma_{415}\rangle$, $H_{1272}=\langle\sigma_{112}, \sigma_{123}\rangle$, $H_{1276}=\langle\sigma_{112}, \sigma_{135}\rangle$, $H_{1281}=\langle\sigma_{112}, \sigma_{266}\rangle$, $H_{1287}=\langle\sigma_{112}, \sigma_{315}\rangle$, $H_{1292}=\langle\sigma_{120}, \sigma_{123}\rangle$, $H_{1294}=\langle\sigma_{120}, \sigma_{127}\rangle$, $H_{1302}=\langle\sigma_{120}, \sigma_{270}\rangle$, $H_{1305}=\langle\sigma_{120}, \sigma_{289}\rangle$
	$H_{1321}=\langle\sigma_{128}, \sigma_{317}\rangle$, $H_{1322}=\langle\sigma_{128}, \sigma_{334}\rangle$, $H_{1323}=\langle\sigma_{128}, \sigma_{342}\rangle$, $H_{1324}=\langle\sigma_{128}, \sigma_{357}\rangle$, $H_{1329}=\langle\sigma_{137}, \sigma_{290}\rangle$, $H_{1330}=\langle\sigma_{137}, \sigma_{312}\rangle$, $H_{1333}=\langle\sigma_{137}, \sigma_{342}\rangle$, $H_{1334}=\langle\sigma_{137}, \sigma_{349}\rangle$, $H_{1339}=\langle\sigma_{144}, \sigma_{290}\rangle$, $H_{1340}=\langle\sigma_{144}, \sigma_{305}\rangle$, $H_{1341}=\langle\sigma_{144}, \sigma_{317}\rangle$, $H_{1342}=\langle\sigma_{144}, \sigma_{326}\rangle$, $H_{1347}=\langle\sigma_{148}, \sigma_{476}\rangle$, $H_{1348}=\langle\sigma_{149}, \sigma_{451}\rangle$, $H_{1349}=\langle\sigma_{182}, \sigma_{342}\rangle$, $H_{1350}=\langle\sigma_{187}, \sigma_{317}\rangle$, $H_{1351}=\langle\sigma_{209}, \sigma_{342}\rangle$, $H_{1352}=\langle\sigma_{213}, \sigma_{290}\rangle$, $H_{1353}=\langle\sigma_{234}, \sigma_{317}\rangle$, $H_{1354}=\langle\sigma_{238}, \sigma_{290}\rangle$
8	$H_{367}=\langle\sigma_2, \sigma_{17}\rangle$, $H_{376}=\langle\sigma_2, \sigma_{83}\rangle$, $H_{378}=\langle\sigma_2, \sigma_{95}\rangle$, $H_{421}=\langle\sigma_2, \sigma_{515}\rangle$, $H_{423}=\langle\sigma_2, \sigma_{527}\rangle$, $H_{429}=\langle\sigma_2, \sigma_{593}\rangle$, $H_{432}=\langle\sigma_3, \sigma_8\rangle$, $H_{437}=\langle\sigma_3, \sigma_{56}\rangle$, $H_{438}=\langle\sigma_3, \sigma_{61}\rangle$, $H_{467}=\langle\sigma_3, \sigma_{392}\rangle$, $H_{468}=\langle\sigma_3, \sigma_{397}\rangle$, $H_{473}=\langle\sigma_3, \sigma_{445}\rangle$, $H_{504}=\langle\sigma_6, \sigma_8\rangle$, $H_{509}=\langle\sigma_6, \sigma_{56}\rangle$, $H_{511}=\langle\sigma_6, \sigma_{68}\rangle$, $H_{539}=\langle\sigma_6, \sigma_{392}\rangle$, $H_{541}=\langle\sigma_6, \sigma_{404}\rangle$, $H_{547}=\langle\sigma_6, \sigma_{470}\rangle$, $H_{557}=\langle\sigma_7, \sigma_{27}\rangle$, $H_{558}=\langle\sigma_7, \sigma_{30}\rangle$, $H_{571}=\langle\sigma_7, \sigma_{267}\rangle$, $H_{572}=\langle\sigma_7, \sigma_{270}\rangle$, $H_{573}=\langle\sigma_7, \sigma_{289}\rangle$, $H_{684}=\langle\sigma_{15}, \sigma_{26}\rangle$, $H_{685}=\langle\sigma_{15}, \sigma_{27}\rangle$, $H_{698}=\langle\sigma_{15}, \sigma_{266}\rangle$, $H_{699}=\langle\sigma_{15}, \sigma_{267}\rangle$, $H_{704}=\langle\sigma_{15}, \sigma_{315}\rangle$, $H_{773}=\langle\sigma_{22}, \sigma_{26}\rangle$, $H_{775}=\langle\sigma_{22}, \sigma_{30}\rangle$, $H_{787}=\langle\sigma_{22}, \sigma_{266}\rangle$, $H_{789}=\langle\sigma_{22}, \sigma_{270}\rangle$, $H_{795}=\langle\sigma_{22}, \sigma_{340}\rangle$, $H_{846}=\langle\sigma_{25}, \sigma_{127}\rangle$, $H_{848}=\langle\sigma_{25}, \sigma_{135}\rangle$, $H_{850}=\langle\sigma_{25}, \sigma_{142}\rangle$, $H_{1003}=\langle\sigma_{55}, \sigma_{123}\rangle$, $H_{1004}=\langle\sigma_{55}, \sigma_{126}\rangle$, $H_{1005}=\langle\sigma_{55}, \sigma_{127}\rangle$, $H_{1129}=\langle\sigma_{81}, \sigma_{122}\rangle$, $H_{1130}=\langle\sigma_{81}, \sigma_{123}\rangle$, $H_{1135}=\langle\sigma_{81}, \sigma_{135}\rangle$ $H_{1230}=\langle\sigma_{106}, \sigma_{122}\rangle$, $H_{1232}=\langle\sigma_{106}, \sigma_{126}\rangle$, $H_{1238}=\langle\sigma_{106}, \sigma_{142}\rangle$
	$H_{384}=\langle\sigma_2, \sigma_{137}\rangle$, $H_{408}=\langle\sigma_2, \sigma_{317}\rangle$, $H_{418}=\langle\sigma_2, \sigma_{451}\rangle$, $H_{425}=\langle\sigma_2, \sigma_{539}\rangle$, $H_{428}=\langle\sigma_2, \sigma_{573}\rangle$, $H_{430}=\langle\sigma_2, \sigma_{599}\rangle$, $H_{444}=\langle\sigma_3, \sigma_{128}\rangle$, $H_{459}=\langle\sigma_3, \sigma_{290}\rangle$, $H_{471}=\langle\sigma_3, \sigma_{416}\rangle$, $H_{474}=\langle\sigma_3, \sigma_{451}\rangle$, $H_{476}=\langle\sigma_3, \sigma_{476}\rangle$, $H_{482}=\langle\sigma_3, \sigma_{694}\rangle$, $H_{516}=\langle\sigma_6, \sigma_{128}\rangle$, $H_{531}=\langle\sigma_6, \sigma_{290}\rangle$, $H_{543}=\langle\sigma_6, \sigma_{416}\rangle$, $H_{546}=\langle\sigma_6, \sigma_{451}\rangle$, $H_{548}=\langle\sigma_6, \sigma_{476}\rangle$, $H_{554}=\langle\sigma_6, \sigma_{573}\rangle$, $H_{574}=\langle\sigma_7, \sigma_{290}\rangle$, $H_{577}=\langle\sigma_7, \sigma_{317}\rangle$, $H_{579}=\langle\sigma_7, \sigma_{342}\rangle$, $H_{583}=\langle\sigma_7, \sigma_{539}\rangle$, $H_{588}=\langle\sigma_7, \sigma_{660}\rangle$, $H_{702}=\langle\sigma_{15}, \sigma_{290}\rangle$, $H_{705}=\langle\sigma_{15}, \sigma_{317}\rangle$, $H_{707}=\langle\sigma_{15}, \sigma_{342}\rangle$, $H_{710}=\langle\sigma_{15}, \sigma_{416}\rangle$, $H_{716}=\langle\sigma_{15}, \sigma_{660}\rangle$, $H_{791}=\langle\sigma_{22}, \sigma_{290}\rangle$, $H_{794}=\langle\sigma_{22}, \sigma_{317}\rangle$, $H_{796}=\langle\sigma_{22}, \sigma_{342}\rangle$, $H_{799}=\langle\sigma_{22}, \sigma_{416}\rangle$, $H_{805}=\langle\sigma_{22}, \sigma_{539}\rangle$, $H_{847}=\langle\sigma_{25}, \sigma_{128}\rangle$, $H_{849}=\langle\sigma_{25}, \sigma_{137}\rangle$, $H_{851}=\langle\sigma_{25}, \sigma_{144}\rangle$, $H_{1006}=\langle\sigma_{55}, \sigma_{128}\rangle$, $H_{1009}=\langle\sigma_{55}, \sigma_{137}\rangle$, $H_{1011}=\langle\sigma_{55}, \sigma_{144}\rangle$, $H_{1133}=\langle\sigma_{81}, \sigma_{128}\rangle$, $H_{1136}=\langle\sigma_{81}, \sigma_{137}\rangle$, $H_{1138}=\langle\sigma_{81}, \sigma_{144}\rangle$, $H_{1234}=\langle\sigma_{106}, \sigma_{128}\rangle$, $H_{1237}=\langle\sigma_{106}, \sigma_{137}\rangle$, $H_{1239}=\langle\sigma_{106}, \sigma_{144}\rangle$

位数	部分群
8	$H_{386}=\langle\sigma_2, \sigma_{151}\rangle$, $H_{390}=\langle\sigma_2, \sigma_{169}\rangle$, $H_{404}=\langle\sigma_2, \sigma_{295}\rangle$, $H_{448}=\langle\sigma_3, \sigma_{166}\rangle$, $H_{454}=\langle\sigma_3, \sigma_{220}\rangle$, $H_{463}=\langle\sigma_3, \sigma_{346}\rangle$, $H_{520}=\langle\sigma_6, \sigma_{159}\rangle$, $H_{526}=\langle\sigma_6, \sigma_{195}\rangle$, $H_{535}=\langle\sigma_6, \sigma_{321}\rangle$, $H_{567}=\langle\sigma_7, \sigma_{202}\rangle$, $H_{568}=\langle\sigma_7, \sigma_{225}\rangle$, $H_{585}=\langle\sigma_7, \sigma_{594}\rangle$, $H_{653}=\langle\sigma_{10}, \sigma_{121}\rangle$, $H_{662}=\langle\sigma_{11}, \sigma_{121}\rangle$, $H_{695}=\langle\sigma_{15}, \sigma_{180}\rangle$, $H_{696}=\langle\sigma_{15}, \sigma_{224}\rangle$, $H_{713}=\langle\sigma_{15}, \sigma_{472}\rangle$, $H_{769}=\langle\sigma_{18}, \sigma_{121}\rangle$, $H_{784}=\langle\sigma_{22}, \sigma_{177}\rangle$, $H_{785}=\langle\sigma_{22}, \sigma_{199}\rangle$, $H_{802}=\langle\sigma_{22}, \sigma_{447}\rangle$, $H_{854}=\langle\sigma_{25}, \sigma_{394}\rangle$, $H_{855}=\langle\sigma_{25}, \sigma_{395}\rangle$, $H_{858}=\langle\sigma_{25}, \sigma_{516}\rangle$, $H_{960}=\langle\sigma_{33}, \sigma_{634}\rangle$, $H_{965}=\langle\sigma_{36}, \sigma_{513}\rangle$, $H_{970}=\langle\sigma_{37}, \sigma_{634}\rangle$, $H_{982}=\langle\sigma_{40}, \sigma_{391}\rangle$, $H_{987}=\langle\sigma_{44}, \sigma_{513}\rangle$, $H_{992}=\langle\sigma_{45}, \sigma_{391}\rangle$, $H_{1014}=\langle\sigma_{55}, \sigma_{280}\rangle$, $H_{1015}=\langle\sigma_{55}, \sigma_{285}\rangle$, $H_{1018}=\langle\sigma_{55}, \sigma_{528}\rangle$, $H_{1062}=\langle\sigma_{58}, \sigma_{265}\rangle$, $H_{1067}=\langle\sigma_{59}, \sigma_{265}\rangle$, $H_{1100}=\langle\sigma_{63}, \sigma_{634}\rangle$, $H_{1126}=\langle\sigma_{70}, \sigma_{513}\rangle$, $H_{1141}=\langle\sigma_{81}, \sigma_{276}\rangle$, $H_{1142}=\langle\sigma_{81}, \sigma_{284}\rangle$, $H_{1145}=\langle\sigma_{81}, \sigma_{406}\rangle$, $H_{1181}=\langle\sigma_{84}, \sigma_{265}\rangle$, $H_{1227}=\langle\sigma_{96}, \sigma_{391}\rangle$, $H_{1242}=\langle\sigma_{106}, \sigma_{273}\rangle$, $H_{1243}=\langle\sigma_{106}, \sigma_{277}\rangle$, $H_{1246}=\langle\sigma_{106}, \sigma_{399}\rangle$
	$H_{599}=\langle\sigma_8, \sigma_{123}\rangle$, $H_{600}=\langle\sigma_8, \sigma_{126}\rangle$, $H_{617}=\langle\sigma_8, \sigma_{289}\rangle$, $H_{635}=\langle\sigma_8, \sigma_{593}\rangle$, $H_{737}=\langle\sigma_{17}, \sigma_{122}\rangle$, $H_{756}=\langle\sigma_{17}, \sigma_{315}\rangle$, $H_{767}=\langle\sigma_{17}, \sigma_{470}\rangle$, $H_{830}=\langle\sigma_{24}, \sigma_{340}\rangle$, $H_{837}=\langle\sigma_{24}, \sigma_{445}\rangle$, $H_{866}=\langle\sigma_{26}, \sigma_{127}\rangle$, $H_{881}=\langle\sigma_{26}, \sigma_{397}\rangle$, $H_{882}=\langle\sigma_{26}, \sigma_{404}\rangle$, $H_{886}=\langle\sigma_{26}, \sigma_{515}\rangle$, $H_{900}=\langle\sigma_{27}, \sigma_{142}\rangle$, $H_{909}=\langle\sigma_{27}, \sigma_{392}\rangle$, $H_{918}=\langle\sigma_{27}, \sigma_{640}\rangle$, $H_{919}=\langle\sigma_{27}, \sigma_{648}\rangle$, $H_{927}=\langle\sigma_{30}, \sigma_{135}\rangle$, $H_{938}=\langle\sigma_{30}, \sigma_{392}\rangle$, $H_{947}=\langle\sigma_{30}, \sigma_{519}\rangle$, $H_{948}=\langle\sigma_{30}, \sigma_{527}\rangle$, $H_{1025}=\langle\sigma_{56}, \sigma_{127}\rangle$, $H_{1041}=\langle\sigma_{56}, \sigma_{267}\rangle$, $H_{1042}=\langle\sigma_{56}, \sigma_{270}\rangle$, $H_{1047}=\langle\sigma_{56}, \sigma_{527}\rangle$, $H_{1078}=\langle\sigma_{61}, \sigma_{126}\rangle$, $H_{1088}=\langle\sigma_{61}, \sigma_{266}\rangle$, $H_{1096}=\langle\sigma_{61}, \sigma_{636}\rangle$, $H_{1103}=\langle\sigma_{68}, \sigma_{123}\rangle$, $H_{1114}=\langle\sigma_{68}, \sigma_{266}\rangle$, $H_{1122}=\langle\sigma_{68}, \sigma_{515}\rangle$, $H_{1161}=\langle\sigma_{83}, \sigma_{135}\rangle$, $H_{1169}=\langle\sigma_{83}, \sigma_{266}\rangle$, $H_{1175}=\langle\sigma_{83}, \sigma_{404}\rangle$, $H_{1183}=\langle\sigma_{87}, \sigma_{122}\rangle$, $H_{1194}=\langle\sigma_{87}, \sigma_{270}\rangle$, $H_{1204}=\langle\sigma_{95}, \sigma_{123}\rangle$, $H_{1216}=\langle\sigma_{95}, \sigma_{270}\rangle$, $H_{1223}=\langle\sigma_{95}, \sigma_{392}\rangle$, $H_{1257}=\langle\sigma_{108}, \sigma_{142}\rangle$, $H_{1265}=\langle\sigma_{108}, \sigma_{397}\rangle$, $H_{1271}=\langle\sigma_{112}, \sigma_{122}\rangle$, $H_{1282}=\langle\sigma_{112}, \sigma_{267}\rangle$, $H_{1293}=\langle\sigma_{120,}\sigma_{126}\rangle$, $H_{1301}=\langle\sigma_{120}, \sigma_{267}\rangle$
	$H_{618}=\langle\sigma_8, \sigma_{290}\rangle$, $H_{636}=\langle\sigma_8, \sigma_{594}\rangle$, $H_{654}=\langle\sigma_{10}, \sigma_{126}\rangle$, $H_{663}=\langle\sigma_{11}, \sigma_{123}\rangle$, $H_{757}=\langle\sigma_{17}, \sigma_{317}\rangle$, $H_{768}=\langle\sigma_{17}, \sigma_{472}\rangle$, $H_{770}=\langle\sigma_{18}, \sigma_{122}\rangle$, $H_{831}=\langle\sigma_{24}, \sigma_{342}\rangle$, $H_{838}=\langle\sigma_{24}, \sigma_{447}\rangle$, $H_{867}=\langle\sigma_{26}, \sigma_{128}\rangle$, $H_{887}=\langle\sigma_{26}, \sigma_{516}\rangle$, $H_{901}=\langle\sigma_{27}, \sigma_{144}\rangle$, $H_{911}=\langle\sigma_{27}, \sigma_{395}\rangle$, $H_{928}=\langle\sigma_{30}, \sigma_{137}\rangle$, $H_{939}=\langle\sigma_{30}, \sigma_{394}\rangle$, $H_{961}=\langle\sigma_{33}, \sigma_{648}\rangle$, $H_{966}=\langle\sigma_{36}, \sigma_{527}\rangle$, $H_{971}=\langle\sigma_{37}, \sigma_{640}\rangle$, $H_{983}=\langle\sigma_{40}, \sigma_{404}\rangle$, $H_{988}=\langle\sigma_{44}, \sigma_{519}\rangle$, $H_{993}=\langle\sigma_{45}, \sigma_{397}\rangle$, $H_{1026}=\langle\sigma_{56}, \sigma_{128}\rangle$, $H_{1048}=\langle\sigma_{56}, \sigma_{528}\rangle$, $H_{1063}=\langle\sigma_{58}, \sigma_{270}\rangle$, $H_{1068}=\langle\sigma_{59}, \sigma_{267}\rangle$, $H_{1082}=\langle\sigma_{61}, \sigma_{137}\rangle$, $H_{1091}=\langle\sigma_{61}, \sigma_{285}\rangle$, $H_{1101}=\langle\sigma_{63}, \sigma_{636}\rangle$, $H_{1110}=\langle\sigma_{68}, \sigma_{144}\rangle$, $H_{1116}=\langle\sigma_{68}, \sigma_{280}\rangle$, $H_{1127}=\langle\sigma_{70}, \sigma_{515}\rangle$, $H_{1162}=\langle\sigma_{83}, \sigma_{137}\rangle$, $H_{1176}=\langle\sigma_{83}, \sigma_{406}\rangle$, $H_{1182}=\langle\sigma_{84}, \sigma_{266}\rangle$, $H_{1187}=\langle\sigma_{87}, \sigma_{128}\rangle$, $H_{1196}=\langle\sigma_{87}, \sigma_{284}\rangle$, $H_{1211}=\langle\sigma_{95}, \sigma_{144}\rangle$, $H_{1217}=\langle\sigma_{95}, \sigma_{276}\rangle$, $H_{1228}=\langle\sigma_{96}, \sigma_{392}\rangle$, $H_{1258}=\langle\sigma_{108}, \sigma_{144}\rangle$, $H_{1266}=\langle\sigma_{108}, \sigma_{399}\rangle$, $H_{1275}=\langle\sigma_{112}, \sigma_{128}\rangle$, $H_{1284}=\langle\sigma_{112}, \sigma_{277}\rangle$, $H_{1297}=\langle\sigma_{120}, \sigma_{137}\rangle$, $H_{1303}=\langle\sigma_{120}, \sigma_{273}\rangle$
	$H_{1371}=\langle\sigma_2, \sigma_7, \sigma_{121}\rangle$, $H_{1376}=\langle\sigma_2, \sigma_{25}, \sigma_{391}\rangle$, $H_{1379}=\langle\sigma_2, \sigma_{55}, \sigma_{265}\rangle$, $H_{1385}=\langle\sigma_3, \sigma_{22}, \sigma_{121}\rangle$, $H_{1390}=\langle\sigma_3, \sigma_{25}, \sigma_{634}\rangle$, $H_{1394}=\langle\sigma_3, \sigma_{106}, \sigma_{265}\rangle$, $H_{1399}=\langle\sigma_6, \sigma_{15}, \sigma_{121}\rangle$, $H_{1404}=\langle\sigma_6, \sigma_{25}, \sigma_{513}\rangle$, $H_{1408}=\langle\sigma_6, \sigma_{81}, \sigma_{265}\rangle$, $H_{1415}=\langle\sigma_7, \sigma_{81}, \sigma_{634}\rangle$, $H_{1418}=\langle\sigma_7, \sigma_{106}, \sigma_{513}\rangle$, $H_{1429}=\langle\sigma_{15}, \sigma_{55}, \sigma_{634}\rangle$, $H_{1432}=\langle\sigma_{15}, \sigma_{106}, \sigma_{391}\rangle$, $H_{1441}=\langle\sigma_{22}, \sigma_{55}, \sigma_{513}\rangle$, $H_{1444}=\langle\sigma_{22}, \sigma_{81}, \sigma_{391}\rangle$
	$H_{1383}=\langle\sigma_2, \sigma_{127}, \sigma_{289}\rangle$, $H_{1396}=\langle\sigma_3, \sigma_{142}, \sigma_{340}\rangle$, $H_{1410}=\langle\sigma_6, \sigma_{135}, \sigma_{315}\rangle$, $H_{1419}=\langle\sigma_7, \sigma_{122}, \sigma_{593}\rangle$, $H_{1420}=\langle\sigma_8, \sigma_{17}, \sigma_{121}\rangle$, $H_{1433}=\langle\sigma_{15}, \sigma_{126}, \sigma_{470}\rangle$, $H_{1445}=\langle\sigma_{22}, \sigma_{123}, \sigma_{445}\rangle$, $H_{1448}=\langle\sigma_{25}, \sigma_{392}, \sigma_{515}\rangle$, $H_{1449}=\langle\sigma_{26}, \sigma_{95}, \sigma_{391}\rangle$, $H_{1450}=\langle\sigma_{27}, \sigma_{61}, \sigma_{634}\rangle$, $H_{1451}=\langle\sigma_{30}, \sigma_{68}, \sigma_{513}\rangle$, $H_{1452}=\langle\sigma_{55}, \sigma_{266}, \sigma_{527}\rangle$, $H_{1453}=\langle\sigma_{56}, \sigma_{83}, \sigma_{265}\rangle$, $H_{1454}=\langle\sigma_{81}, \sigma_{270}, \sigma_{404}\rangle$, $H_{1455}=\langle\sigma_{106}, \sigma_{267}, \sigma_{397}\rangle$
9	$H_{490}=\langle\sigma_4, \sigma_{145}\rangle$, $H_{641}=\langle\sigma_9, \sigma_{226}\rangle$, $H_{673}=\langle\sigma_{12}, \sigma_{201}\rangle$, $H_{722}=\langle\sigma_{16}, \sigma_{175}\rangle$, $H_{954}=\langle\sigma_{31}, \sigma_{514}\rangle$, $H_{976}=\langle\sigma_{39}, \sigma_{396}\rangle$, $H_{998}=\langle\sigma_{46}, \sigma_{393}\rangle$, $H_{1057}=\langle\sigma_{57}, \sigma_{286}\rangle$, $H_{1074}=\langle\sigma_{60}, \sigma_{279}\rangle$, $H_{1153}=\langle\sigma_{82}, \sigma_{271}\rangle$
10	$H_{592}=\langle\sigma_8, \sigma_{27}\rangle$, $H_{593}=\langle\sigma_8, \sigma_{30}\rangle$, $H_{613}=\langle\sigma_8, \sigma_{267}\rangle$, $H_{614}=\langle\sigma_8, \sigma_{270}\rangle$, $H_{732}=\langle\sigma_{17}, \sigma_{26}\rangle$, $H_{733}=\langle\sigma_{17}, \sigma_{27}\rangle$, $H_{748}=\langle\sigma_{17}, \sigma_{266}\rangle$, $H_{749}=\langle\sigma_{17}, \sigma_{267}\rangle$, $H_{807}=\langle\sigma_{24}, \sigma_{26}\rangle$, $H_{809}=\langle\sigma_{24}, \sigma_{30}\rangle$, $H_{822}=\langle\sigma_{24}, \sigma_{266}\rangle$, $H_{824}=\langle\sigma_{24}, \sigma_{270}\rangle$, $H_{868}=\langle\sigma_{26}, \sigma_{135}\rangle$, $H_{870}=\langle\sigma_{26}, \sigma_{142}\rangle$, $H_{896}=\langle\sigma_{27}, \sigma_{127}\rangle$, $H_{898}=\langle\sigma_{27}, \sigma_{135}\rangle$, $H_{925}=\langle\sigma_{30}, \sigma_{127}\rangle$, $H_{929}=\langle\sigma_{30}, \sigma_{142}\rangle$, $H_{1023}=\langle\sigma_{56}, \sigma_{123}\rangle$, $H_{1024}=\langle\sigma_{56}, \sigma_{126}\rangle$, $H_{1077}=\langle\sigma_{61}, \sigma_{123}\rangle$, $H_{1079}=\langle\sigma_{61}, \sigma_{127}\rangle$, $H_{1104}=\langle\sigma_{68}, \sigma_{126}\rangle$, $H_{1105}=\langle\sigma_{68}, \sigma_{127}\rangle$, $H_{1155}=\langle\sigma_{83}, \sigma_{122}\rangle$, $H_{1156}=\langle\sigma_{83}, \sigma_{123}\rangle$, $H_{1184}=\langle\sigma_{87}, \sigma_{123}\rangle$, $H_{1188}=\langle\sigma_{87}, \sigma_{135}\rangle$, $H_{1203}=\langle\sigma_{95}, \sigma_{122}\rangle$, $H_{1208}=\langle\sigma_{95}, \sigma_{135}\rangle$, $H_{1249}=\langle\sigma_{108}, \sigma_{122}\rangle$, $H_{1251}=\langle\sigma_{108}, \sigma_{126}\rangle$, $H_{1273}=\langle\sigma_{112}, \sigma_{126}\rangle$, $H_{1278}=\langle\sigma_{112}, \sigma_{142}\rangle$, $H_{1291}=\langle\sigma_{120}, \sigma_{122}\rangle$, $H_{1298}=\langle\sigma_{120}, \sigma_{142}\rangle$

位数	部分群
12	$H_{369}=\langle\sigma_2, \sigma_{27}\rangle$, $H_{374}=\langle\sigma_2, \sigma_{61}\rangle$, $H_{377}=\langle\sigma_2, \sigma_{87}\rangle$, $H_{380}=\langle\sigma_2, \sigma_{123}\rangle$, $H_{383}=\langle\sigma_2, \sigma_{135}\rangle$, $H_{399}=\langle\sigma_2, \sigma_{267}\rangle$, $H_{407}=\langle\sigma_2, \sigma_{315}\rangle$, $H_{413}=\langle\sigma_2, \sigma_{397}\rangle$, $H_{417}=\langle\sigma_2, \sigma_{445}\rangle$, $H_{422}=\langle\sigma_2, \sigma_{519}\rangle$, $H_{424}=\langle\sigma_2, \sigma_{537}\rangle$, $H_{427}=\langle\sigma_2, \sigma_{567}\rangle$, $H_{439}=\langle\sigma_3, \sigma_{68}\rangle$, $H_{441}=\langle\sigma_3, \sigma_{112}\rangle$, $H_{443}=\langle\sigma_3, \sigma_{127}\rangle$, $H_{458}=\langle\sigma_3, \sigma_{289}\rangle$, $H_{469}=\langle\sigma_3, \sigma_{404}\rangle$, $H_{470}=\langle\sigma_3, \sigma_{415}\rangle$, $H_{475}=\langle\sigma_3, \sigma_{470}\rangle$, $H_{478}=\langle\sigma_3, \sigma_{640}\rangle$, $H_{481}=\langle\sigma_3, \sigma_{688}\rangle$, $H_{510}=\langle\sigma_6, \sigma_{61}\rangle$, $H_{513}=\langle\sigma_6, \sigma_{87}\rangle$, $H_{515}=\langle\sigma_6, \sigma_{127}\rangle$, $H_{530}=\langle\sigma_6, \sigma_{289}\rangle$, $H_{540}=\langle\sigma_6, \sigma_{397}\rangle$, $H_{542}=\langle\sigma_6, \sigma_{415}\rangle$, $H_{545}=\langle\sigma_6, \sigma_{445}\rangle$, $H_{550}=\langle\sigma_6, \sigma_{519}\rangle$, $H_{553}=\langle\sigma_6, \sigma_{567}\rangle$, $H_{556}=\langle\sigma_7, \sigma_{26}\rangle$, $H_{570}=\langle\sigma_7, \sigma_{266}\rangle$, $H_{575}=\langle\sigma_7, \sigma_{315}\rangle$, $H_{578}=\langle\sigma_7, \sigma_{340}\rangle$, $H_{581}=\langle\sigma_7, \sigma_{537}\rangle$, $H_{587}=\langle\sigma_7, \sigma_{658}\rangle$, $H_{686}=\langle\sigma_{15}, \sigma_{30}\rangle$, $H_{700}=\langle\sigma_{15}, \sigma_{270}\rangle$, $H_{701}=\langle\sigma_{15}, \sigma_{289}\rangle$, $H_{706}=\langle\sigma_{15}, \sigma_{340}\rangle$, $H_{709}=\langle\sigma_{15}, \sigma_{415}\rangle$, $H_{715}=\langle\sigma_{15}, \sigma_{658}\rangle$, $H_{774}=\langle\sigma_{22}, \sigma_{27}\rangle$, $H_{788}=\langle\sigma_{22}, \sigma_{267}\rangle$, $H_{790}=\langle\sigma_{22}, \sigma_{289}\rangle$, $H_{793}=\langle\sigma_{22}, \sigma_{315}\rangle$, $H_{798}=\langle\sigma_{22}, \sigma_{415}\rangle$, $H_{804}=\langle\sigma_{22}, \sigma_{537}\rangle$, $H_{842}=\langle\sigma_{25}, \sigma_{122}\rangle$, $H_{843}=\langle\sigma_{25}, \sigma_{123}\rangle$, $H_{845}=\langle\sigma_{25}, \sigma_{126}\rangle$, $H_{1002}=\langle\sigma_{55}, \sigma_{122}\rangle$, $H_{1007}=\langle\sigma_{55}, \sigma_{135}\rangle$, $H_{1010}=\langle\sigma_{55}, \sigma_{142}\rangle$, $H_{1131}=\langle\sigma_{81}, \sigma_{126}\rangle$, $H_{1132}=\langle\sigma_{81}, \sigma_{127}\rangle$, $H_{1137}=\langle\sigma_{81}, \sigma_{142}\rangle$, $H_{1231}=\langle\sigma_{106}, \sigma_{123}\rangle$, $H_{1233}=\langle\sigma_{106}, \sigma_{127}\rangle$, $H_{1236}=\langle\sigma_{106}, \sigma_{135}\rangle$
	$H_{483}=\langle\sigma_4, \sigma_8\rangle$, $H_{486}=\langle\sigma_4, \sigma_{56}\rangle$, $H_{497}=\langle\sigma_4, \sigma_{392}\rangle$, $H_{637}=\langle\sigma_9, \sigma_{27}\rangle$, $H_{642}=\langle\sigma_9, \sigma_{267}\rangle$, $H_{669}=\langle\sigma_{12}, \sigma_{30}\rangle$, $H_{674}=\langle\sigma_{12}, \sigma_{270}\rangle$, $H_{718}=\langle\sigma_{16}, \sigma_{26}\rangle$, $H_{723}=\langle\sigma_{16}, \sigma_{266}\rangle$, $H_{950}=\langle\sigma_{31}, \sigma_{127}\rangle$, $H_{973}=\langle\sigma_{39}, \sigma_{135}\rangle$, $H_{996}=\langle\sigma_{46}, \sigma_{142}\rangle$, $H_{1052}=\langle\sigma_{57}, \sigma_{123}\rangle$, $H_{1069}=\langle\sigma_{60}, \sigma_{126}\rangle$, $H_{1148}=\langle\sigma_{82}, \sigma_{122}\rangle$
	$H_{619}=\langle\sigma_8, \sigma_{305}\rangle$, $H_{758}=\langle\sigma_{17}, \sigma_{326}\rangle$, $H_{832}=\langle\sigma_{24}, \sigma_{349}\rangle$, $H_{878}=\langle\sigma_{26}, \sigma_{213}\rangle$, $H_{906}=\langle\sigma_{27}, \sigma_{182}\rangle$, $H_{936}=\langle\sigma_{30}, \sigma_{187}\rangle$, $H_{1038}=\langle\sigma_{56}, \sigma_{209}\rangle$, $H_{1085}=\langle\sigma_{61}, \sigma_{148}\rangle$, $H_{1111}=\langle\sigma_{68}, \sigma_{149}\rangle$, $H_{1167}=\langle\sigma_{83}, \sigma_{182}\rangle$, $H_{1192}=\langle\sigma_{87}, \sigma_{149}\rangle$, $H_{1212}=\langle\sigma_{95}, \sigma_{148}\rangle$, $H_{1259}=\langle\sigma_{108}, \sigma_{187}\rangle$, $H_{1280}=\langle\sigma_{112}, \sigma_{148}\rangle$, $H_{1300}=\langle\sigma_{120}, \sigma_{149}\rangle$
	$H_{622}=\langle\sigma_8, \sigma_{317}\rangle$, $H_{626}=\langle\sigma_8, \sigma_{342}\rangle$, $H_{632}=\langle\sigma_8, \sigma_{539}\rangle$, $H_{634}=\langle\sigma_8, \sigma_{564}\rangle$, $H_{752}=\langle\sigma_{17}, \sigma_{290}\rangle$, $H_{760}=\langle\sigma_{17}, \sigma_{342}\rangle$, $H_{763}=\langle\sigma_{17}, \sigma_{416}\rangle$, $H_{765}=\langle\sigma_{17}, \sigma_{442}\rangle$, $H_{826}=\langle\sigma_{24}, \sigma_{290}\rangle$, $H_{829}=\langle\sigma_{24}, \sigma_{317}\rangle$, $H_{835}=\langle\sigma_{24}, \sigma_{416}\rangle$, $H_{839}=\langle\sigma_{24}, \sigma_{465}\rangle$, $H_{869}=\langle\sigma_{26}, \sigma_{137}\rangle$, $H_{871}=\langle\sigma_{26}, \sigma_{144}\rangle$, $H_{890}=\langle\sigma_{26}, \sigma_{573}\rangle$, $H_{891}=\langle\sigma_{26}, \sigma_{576}\rangle$, $H_{897}=\langle\sigma_{27}, \sigma_{128}\rangle$, $H_{899}=\langle\sigma_{27}, \sigma_{137}\rangle$, $H_{914}=\langle\sigma_{27}, \sigma_{451}\rangle$, $H_{915}=\langle\sigma_{27}, \sigma_{455}\rangle$, $H_{926}=\langle\sigma_{30}, \sigma_{128}\rangle$, $H_{930}=\langle\sigma_{30}, \sigma_{144}\rangle$, $H_{943}=\langle\sigma_{30}, \sigma_{451}\rangle$, $H_{944}=\langle\sigma_{30}, \sigma_{454}\rangle$, $H_{1029}=\langle\sigma_{56}, \sigma_{137}\rangle$, $H_{1031}=\langle\sigma_{56}, \sigma_{144}\rangle$, $H_{1050}=\langle\sigma_{56}, \sigma_{539}\rangle$, $H_{1051}=\langle\sigma_{56}, \sigma_{546}\rangle$, $H_{1080}=\langle\sigma_{61}, \sigma_{128}\rangle$, $H_{1084}=\langle\sigma_{61}, \sigma_{144}\rangle$, $H_{1093}=\langle\sigma_{61}, \sigma_{317}\rangle$, $H_{1094}=\langle\sigma_{61}, \sigma_{329}\rangle$, $H_{1106}=\langle\sigma_{68}, \sigma_{128}\rangle$, $H_{1108}=\langle\sigma_{68}, \sigma_{137}\rangle$, $H_{1119}=\langle\sigma_{68}, \sigma_{317}\rangle$, $H_{1120}=\langle\sigma_{68}, \sigma_{324}\rangle$, $H_{1159}=\langle\sigma_{83}, \sigma_{128}\rangle$, $H_{1164}=\langle\sigma_{83}, \sigma_{144}\rangle$, $H_{1178}=\langle\sigma_{83}, \sigma_{416}\rangle$, $H_{1179}=\langle\sigma_{83}, \sigma_{424}\rangle$, $H_{1189}=\langle\sigma_{87}, \sigma_{137}\rangle$, $H_{1191}=\langle\sigma_{87}, \sigma_{144}\rangle$, $H_{1197}=\langle\sigma_{87}, \sigma_{290}\rangle$, $H_{1198}=\langle\sigma_{87}, \sigma_{302}\rangle$, $H_{1207}=\langle\sigma_{95}, \sigma_{128}\rangle$, $H_{1209}=\langle\sigma_{95}, \sigma_{137}\rangle$, $H_{1220}=\langle\sigma_{95}, \sigma_{290}\rangle$, $H_{1221}=\langle\sigma_{95}, \sigma_{298}\rangle$, $H_{1253}=\langle\sigma_{108}, \sigma_{128}\rangle$, $H_{1256}=\langle\sigma_{108}, \sigma_{137}\rangle$, $H_{1269}=\langle\sigma_{108}, \sigma_{416}\rangle$, $H_{1270}=\langle\sigma_{108}, \sigma_{429}\rangle$, $H_{1277}=\langle\sigma_{112}, \sigma_{137}\rangle$, $H_{1279}=\langle\sigma_{112}, \sigma_{144}\rangle$, $H_{1285}=\langle\sigma_{112}, \sigma_{290}\rangle$, $H_{1286}=\langle\sigma_{112}, \sigma_{307}\rangle$, $H_{1295}=\langle\sigma_{120}, \sigma_{128}\rangle$, $H_{1299}=\langle\sigma_{120}, \sigma_{144}\rangle$, $H_{1306}=\langle\sigma_{120}, \sigma_{290}\rangle$, $H_{1307}=\langle\sigma_{120}, \sigma_{299}\rangle$
16	$H_{1372}=\langle\sigma_2, \sigma_7, \sigma_{289}\rangle$, $H_{1373}=\langle\sigma_2, \sigma_7, \sigma_{593}\rangle$, $H_{1374}=\langle\sigma_2, \sigma_{17}, \sigma_{121}\rangle$, $H_{1375}=\langle\sigma_2, \sigma_{25}, \sigma_{127}\rangle$, $H_{1377}=\langle\sigma_2, \sigma_{25}, \sigma_{515}\rangle$, $H_{1378}=\langle\sigma_2, \sigma_{55}, \sigma_{127}\rangle$, $H_{1380}=\langle\sigma_2, \sigma_{55}, \sigma_{527}\rangle$, $H_{1381}=\langle\sigma_2, \sigma_{83}, \sigma_{265}\rangle$, $H_{1382}=\langle\sigma_2, \sigma_{95}, \sigma_{391}\rangle$, $H_{1384}=\langle\sigma_3, \sigma_8, \sigma_{121}\rangle$, $H_{1386}=\langle\sigma_3, \sigma_{22}, \sigma_{340}\rangle$, $H_{1387}=\langle\sigma_3, \sigma_{22}, \sigma_{445}\rangle$, $H_{1388}=\langle\sigma_3, \sigma_{25}, \sigma_{142}\rangle$, $H_{1389}=\langle\sigma_3, \sigma_{25}, \sigma_{392}\rangle$, $H_{1391}=\langle\sigma_3, \sigma_{56}, \sigma_{265}\rangle$, $H_{1392}=\langle\sigma_3, \sigma_{61}, \sigma_{634}\rangle$, $H_{1393}=\langle\sigma_3, \sigma_{106}, \sigma_{142}\rangle$, $H_{1395}=\langle\sigma_3, \sigma_{106}, \sigma_{397}\rangle$, $H_{1398}=\langle\sigma_6, \sigma_8, \sigma_{121}\rangle$, $H_{1400}=\langle\sigma_6, \sigma_{15}, \sigma_{315}\rangle$, $H_{1401}=\langle\sigma_6, \sigma_{15}, \sigma_{470}\rangle$, $H_{1402}=\langle\sigma_6, \sigma_{25}, \sigma_{135}\rangle$, $H_{1403}=\langle\sigma_6, \sigma_{25}, \sigma_{392}\rangle$, $H_{1405}=\langle\sigma_6, \sigma_{56}, \sigma_{265}\rangle$, $H_{1406}=\langle\sigma_6, \sigma_{68}, \sigma_{513}\rangle$, $H_{1407}=\langle\sigma_6, \sigma_{81}, \sigma_{135}\rangle$, $H_{1409}=\langle\sigma_6, \sigma_{81}, \sigma_{404}\rangle$, $H_{1411}=\langle\sigma_7, \sigma_{27}, \sigma_{634}\rangle$, $H_{1412}=\langle\sigma_7, \sigma_{30}, \sigma_{513}\rangle$, $H_{1413}=\langle\sigma_7, \sigma_{81}, \sigma_{122}\rangle$, $H_{1414}=\langle\sigma_7, \sigma_{81}, \sigma_{270}\rangle$, $H_{1416}=\langle\sigma_7, \sigma_{106}, \sigma_{122}\rangle$, $H_{1417}=\langle\sigma_7, \sigma_{106}, \sigma_{267}\rangle$, $H_{1425}=\langle\sigma_{15}, \sigma_{26}, \sigma_{391}\rangle$, $H_{1426}=\langle\sigma_{15}, \sigma_{27}, \sigma_{634}\rangle$, $H_{1427}=\langle\sigma_{15}, \sigma_{55}, \sigma_{126}\rangle$, $H_{1428}=\langle\sigma_{15}, \sigma_{55}, \sigma_{266}\rangle$, $H_{1430}=\langle\sigma_{15}, \sigma_{106}, \sigma_{126}\rangle$, $H_{1431}=\langle\sigma_{15}, \sigma_{106}, \sigma_{267}\rangle$, $H_{1437}=\langle\sigma_{22}, \sigma_{26}, \sigma_{391}\rangle$, $H_{1438}=\langle\sigma_{22}, \sigma_{30}, \sigma_{513}\rangle$, $H_{1439}=\langle\sigma_{22}, \sigma_{55}, \sigma_{123}\rangle$, $H_{1440}=\langle\sigma_{22}, \sigma_{55}, \sigma_{266}\rangle$, $H_{1442}=\langle\sigma_{22}, \sigma_{81}, \sigma_{123}\rangle$, $H_{1443}=\langle\sigma_{22}, \sigma_{81}, \sigma_{270}\rangle$
18	$H_{385}=\langle\sigma_2, \sigma_{147}\rangle$, $H_{392}=\langle\sigma_2, \sigma_{181}\rangle$, $H_{410}=\langle\sigma_2, \sigma_{325}\rangle$, $H_{426}=\langle\sigma_2, \sigma_{543}\rangle$, $H_{455}=\langle\sigma_3, \sigma_{232}\rangle$, $H_{461}=\langle\sigma_3, \sigma_{310}\rangle$, $H_{472}=\langle\sigma_3, \sigma_{428}\rangle$, $H_{527}=\langle\sigma_6, \sigma_{207}\rangle$, $H_{533}=\langle\sigma_6, \sigma_{303}\rangle$, $H_{544}=\langle\sigma_6, \sigma_{421}\rangle$, $H_{576}=\langle\sigma_7, \sigma_{316}\rangle$, $H_{582}=\langle\sigma_7, \sigma_{538}\rangle$, $H_{703}=\langle\sigma_{15}, \sigma_{294}\rangle$, $H_{711}=\langle\sigma_{15}, \sigma_{420}\rangle$, $H_{792}=\langle\sigma_{22}, \sigma_{291}\rangle$, $H_{800}=\langle\sigma_{22}, \sigma_{417}\rangle$, $H_{844}=\langle\sigma_{25}, \sigma_{124}\rangle$, $H_{1008}=\langle\sigma_{55}, \sigma_{136}\rangle$, $H_{1134}=\langle\sigma_{81}, \sigma_{132}\rangle$, $H_{1235}=\langle\sigma_{106}, \sigma_{129}\rangle$
	$H_{500}=\langle\sigma_4, \sigma_{451}\rangle$, $H_{502}=\langle\sigma_4, \sigma_{476}\rangle$, $H_{643}=\langle\sigma_9, \sigma_{290}\rangle$, $H_{645}=\langle\sigma_9, \sigma_{317}\rangle$, $H_{675}=\langle\sigma_{12}, \sigma_{290}\rangle$, $H_{679}=\langle\sigma_{12}, \sigma_{342}\rangle$, $H_{726}=\langle\sigma_{16}, \sigma_{317}\rangle$, $H_{728}=\langle\sigma_{16}, \sigma_{342}\rangle$, $H_{952}=\langle\sigma_{31}, \sigma_{137}\rangle$, $H_{953}=\langle\sigma_{31}, \sigma_{144}\rangle$, $H_{972}=\langle\sigma_{39}, \sigma_{128}\rangle$, $H_{975}=\langle\sigma_{39}, \sigma_{144}\rangle$, $H_{994}=\langle\sigma_{46}, \sigma_{128}\rangle$, $H_{995}=\langle\sigma_{46}, \sigma_{137}\rangle$, $H_{1053}=\langle\sigma_{57}, \sigma_{128}\rangle$, $H_{1054}=\langle\sigma_{57}, \sigma_{137}\rangle$, $H_{1070}=\langle\sigma_{60}, \sigma_{128}\rangle$, $H_{1072}=\langle\sigma_{60}, \sigma_{144}\rangle$, $H_{1150}=\langle\sigma_{82}, \sigma_{137}\rangle$, $H_{1151}=\langle\sigma_{82}, \sigma_{144}\rangle$

位数	部分群
18	$H_{1397}=\langle\sigma_4, \sigma_{26}, \sigma_{122}\rangle$, $H_{1421}=\langle\sigma_8, \sigma_{26}, \sigma_{514}\rangle$, $H_{1422}=\langle\sigma_8, \sigma_{82}, \sigma_{266}\rangle$, $H_{1423}=\langle\sigma_9, \sigma_{108}, \sigma_{123}\rangle$, $H_{1424}=\langle\sigma_{12}, \sigma_{83}, \sigma_{126}\rangle$, $H_{1434}=\langle\sigma_{16}, \sigma_{56}, \sigma_{122}\rangle$, $H_{1435}=\langle\sigma_{17}, \sigma_{30}, \sigma_{396}\rangle$, $H_{1436}=\langle\sigma_{17}, \sigma_{60}, \sigma_{270}\rangle$, $H_{1446}=\langle\sigma_{24}, \sigma_{27}, \sigma_{393}\rangle$, $H_{1447}=\langle\sigma_{24}, \sigma_{57}, \sigma_{267}\rangle$
20	$H_{594}=\langle\sigma_8, \sigma_{33}\rangle$, $H_{595}=\langle\sigma_8, \sigma_{36}\rangle$, $H_{615}=\langle\sigma_8, \sigma_{273}\rangle$, $H_{616}=\langle\sigma_8, \sigma_{276}\rangle$, $H_{651}=\langle\sigma_{10}, \sigma_{26}\rangle$, $H_{652}=\langle\sigma_{10}, \sigma_{27}\rangle$, $H_{657}=\langle\sigma_{10}, \sigma_{266}\rangle$, $H_{658}=\langle\sigma_{10}, \sigma_{267}\rangle$, $H_{660}=\langle\sigma_{11}, \sigma_{26}\rangle$, $H_{661}=\langle\sigma_{11}, \sigma_{30}\rangle$, $H_{666}=\langle\sigma_{11}, \sigma_{266}\rangle$, $H_{667}=\langle\sigma_{11}, \sigma_{270}\rangle$, $H_{874}=\langle\sigma_{26}, \sigma_{159}\rangle$, $H_{875}=\langle\sigma_{26}, \sigma_{166}\rangle$, $H_{902}=\langle\sigma_{27}, \sigma_{151}\rangle$, $H_{903}=\langle\sigma_{27}, \sigma_{159}\rangle$, $H_{931}=\langle\sigma_{30}, \sigma_{151}\rangle$, $H_{934}=\langle\sigma_{30}, \sigma_{166}\rangle$, $H_{957}=\langle\sigma_{33}, \sigma_{123}\rangle$, $H_{958}=\langle\sigma_{33}, \sigma_{127}\rangle$, $H_{962}=\langle\sigma_{36}, \sigma_{126}\rangle H_{963}=\langle\sigma_{36}, \sigma_{127}\rangle$, $H_{967}=\langle\sigma_{37}, \sigma_{123}\rangle$, $H_{969}=\langle\sigma_{37}, \sigma_{135}\rangle$, $H_{979}=\langle\sigma_{40}, \sigma_{122}\rangle$, $H_{980}=\langle\sigma_{40}, \sigma_{135}\rangle$, $H_{984}=\langle\sigma_{44}, \sigma_{126}\rangle$, $H_{986}=\langle\sigma_{44}, \sigma_{142}\rangle$, $H_{989}=\langle\sigma_{45}, \sigma_{122}\rangle$, $H_{991}=\langle\sigma_{45}, \sigma_{142}\rangle$, $H_{1036}=\langle\sigma_{56}, \sigma_{177}\rangle$, $H_{1037}=\langle\sigma_{56}, \sigma_{180}\rangle$, $H_{1059}=\langle\sigma_{58}, \sigma_{122}\rangle$, $H_{1060}=\langle\sigma_{58}, \sigma_{123}\rangle$, $H_{1064}=\langle\sigma_{59}, \sigma_{122}\rangle$, $H_{1065}=\langle\sigma_{59}, \sigma_{126}\rangle$
24	$H_{365}=\langle\sigma_2, \sigma_9\rangle$, $H_{371}=\langle\sigma_2, \sigma_{39}\rangle$, $H_{373}=\langle\sigma_2, \sigma_{57}\rangle$, $H_{394}=\langle\sigma_2, \sigma_{201}\rangle$, $H_{401}=\langle\sigma_2, \sigma_{279}\rangle$, $H_{412}=\langle\sigma_2, \sigma_{393}\rangle$, $H_{435}=\langle\sigma_3, \sigma_{31}\rangle$, $H_{450}=\langle\sigma_3, \sigma_{175}\rangle$, $H_{457}=\langle\sigma_3, \sigma_{271}\rangle$, $H_{507}=\langle\sigma_6, \sigma_{31}\rangle$, $H_{522}=\langle\sigma_6, \sigma_{175}\rangle$, $H_{529}=\langle\sigma_6, \sigma_{271}\rangle$, $H_{563}=\langle\sigma_7, \sigma_{145}\rangle$, $H_{691}=\langle\sigma_{15}, \sigma_{145}\rangle$, $H_{780}=\langle\sigma_{22}, \sigma_{145}\rangle$
	$H_{396}=\langle\sigma_2, \sigma_{209}\rangle$, $H_{397}=\langle\sigma_2, \sigma_{213}\rangle$, $H_{406}=\langle\sigma_2, \sigma_{305}\rangle$, $H_{451}=\langle\sigma_3, \sigma_{182}\rangle$, $H_{452}=\langle\sigma_3, \sigma_{187}\rangle$, $H_{464}=\langle\sigma_3, \sigma_{349}\rangle$, $H_{524}=\langle\sigma_6, \sigma_{182}\rangle$, $H_{525}=\langle\sigma_6, \sigma_{187}\rangle$, $H_{537}=\langle\sigma_6, \sigma_{326}\rangle$, $H_{565}=\langle\sigma_7, \sigma_{148}\rangle$, $H_{566}=\langle\sigma_7, \sigma_{149}\rangle$, $H_{692}=\langle\sigma_{15}, \sigma_{148}\rangle$, $H_{693}=\langle\sigma_{15}, \sigma_{149}\rangle$, $H_{782}=\langle\sigma_{22}, \sigma_{148}\rangle$, $H_{783}=\langle\sigma_{22}, \sigma_{149}\rangle$
	$H_{488}=\langle\sigma_4, \sigma_{127}\rangle$, $H_{495}=\langle\sigma_4, \sigma_{289}\rangle$, $H_{498}=\langle\sigma_4, \sigma_{415}\rangle$, $H_{602}=\langle\sigma_8, \sigma_{145}\rangle$, $H_{611}=\langle\sigma_8, \sigma_{201}\rangle$, $H_{646}=\langle\sigma_9, \sigma_{340}\rangle$, $H_{649}=\langle\sigma_9, \sigma_{658}\rangle$, $H_{677}=\langle\sigma_{12}, \sigma_{315}\rangle$, $H_{681}=\langle\sigma_{12}, \sigma_{537}\rangle$, $H_{724}=\langle\sigma_{16}, \sigma_{289}\rangle$, $H_{730}=\langle\sigma_{16}, \sigma_{415}\rangle$, $H_{740}=\langle\sigma_{17}, \sigma_{145}\rangle$, $H_{747}=\langle\sigma_{17}, \sigma_{175}\rangle$, $H_{814}=\langle\sigma_{24}, \sigma_{145}\rangle$, $H_{821}=\langle\sigma_{24}, \sigma_{175}\rangle$
	$H_{489}=\langle\sigma_4, \sigma_{128}\rangle$, $H_{496}=\langle\sigma_4, \sigma_{290}\rangle$, $H_{499}=\langle\sigma_4, \sigma_{416}\rangle$, $H_{647}=\langle\sigma_9, \sigma_{342}\rangle$, $H_{650}=\langle\sigma_9, \sigma_{660}\rangle$, $H_{678}=\langle\sigma_{12}, \sigma_{317}\rangle$, $H_{682}=\langle\sigma_{12}, \sigma_{539}\rangle$, $H_{725}=\langle\sigma_{16}, \sigma_{290}\rangle$, $H_{731}=\langle\sigma_{16}, \sigma_{416}\rangle$, $H_{951}=\langle\sigma_{31}, \sigma_{128}\rangle$, $H_{974}=\langle\sigma_{39}, \sigma_{137}\rangle$, $H_{997}=\langle\sigma_{46}, \sigma_{144}\rangle$, $H_{1055}=\langle\sigma_{57}, \sigma_{144}\rangle$, $H_{1071}=\langle\sigma_{60}, \sigma_{137}\rangle$, $H_{1149}=\langle\sigma_{82}, \sigma_{128}\rangle$
	$H_{624}=\langle\sigma_8, \sigma_{323}\rangle$, $H_{628}=\langle\sigma_8, \sigma_{348}\rangle$, $H_{755}=\langle\sigma_{17}, \sigma_{296}\rangle$, $H_{876}=\langle\sigma_{26}, \sigma_{186}\rangle$, $H_{877}=\langle\sigma_{26}, \sigma_{191}\rangle$, $H_{907}=\langle\sigma_{27}, \sigma_{187}\rangle$, $H_{908}=\langle\sigma_{27}, \sigma_{213}\rangle$, $H_{935}=\langle\sigma_{30}, \sigma_{182}\rangle$, $H_{937}=\langle\sigma_{30}, \sigma_{212}\rangle$, $H_{1033}=\langle\sigma_{56}, \sigma_{161}\rangle$, $H_{1035}=\langle\sigma_{56}, \sigma_{168}\rangle$, $H_{1087}=\langle\sigma_{61}, \sigma_{209}\rangle$, $H_{1113}=\langle\sigma_{68}, \sigma_{197}\rangle$, $H_{1166}=\langle\sigma_{83}, \sigma_{152}\rangle$, $H_{1214}=\langle\sigma_{95}, \sigma_{170}\rangle$
	$H_{659}=\langle\sigma_{10}, \sigma_{317}\rangle$, $H_{668}=\langle\sigma_{11}, \sigma_{342}\rangle$, $H_{771}=\langle\sigma_{18}, \sigma_{290}\rangle$, $H_{959}=\langle\sigma_{33}, \sigma_{137}\rangle$, $H_{964}=\langle\sigma_{36}, \sigma_{144}\rangle$, $H_{968}=\langle\sigma_{37}, \sigma_{128}\rangle$, $H_{981}=\langle\sigma_{40}, \sigma_{144}\rangle$, $H_{985}=\langle\sigma_{44}, \sigma_{128}\rangle$, $H_{990}=\langle\sigma_{45}, \sigma_{137}\rangle$, $H_{1061}=\langle\sigma_{58}, \sigma_{137}\rangle$, $H_{1066}=\langle\sigma_{59}, \sigma_{144}\rangle$, $H_{1099}=\langle\sigma_{63}, \sigma_{144}\rangle$, $H_{1125}=\langle\sigma_{70}, \sigma_{137}\rangle$, $H_{1180}=\langle\sigma_{84}, \sigma_{128}\rangle$, $H_{1226}=\langle\sigma_{96}, \sigma_{128}\rangle$
36	$H_{501}=\langle\sigma_4, \sigma_{452}\rangle$, $H_{607}=\langle\sigma_8, \sigma_{161}\rangle$, $H_{609}=\langle\sigma_8, \sigma_{197}\rangle$, $H_{644}=\langle\sigma_9, \sigma_{293}\rangle$, $H_{676}=\langle\sigma_{12}, \sigma_{292}\rangle$, $H_{727}=\langle\sigma_{16}, \sigma_{318}\rangle$, $H_{743}=\langle\sigma_{17}, \sigma_{152}\rangle$, $H_{745}=\langle\sigma_{17}, \sigma_{170}\rangle$, $H_{817}=\langle\sigma_{24}, \sigma_{152}\rangle$, $H_{819}=\langle\sigma_{24}, \sigma_{170}\rangle$
	$H_{608}=\langle\sigma_8, \sigma_{162}\rangle$, $H_{610}=\langle\sigma_8, \sigma_{198}\rangle$, $H_{744}=\langle\sigma_{17}, \sigma_{154}\rangle$, $H_{746}=\langle\sigma_{17}, \sigma_{172}\rangle$, $H_{818}=\langle\sigma_{24}, \sigma_{155}\rangle$, $H_{820}=\langle\sigma_{24}, \sigma_{173}\rangle$, $H_{884}=\langle\sigma_{26}, \sigma_{454}\rangle$, $H_{1044}=\langle\sigma_{56}, \sigma_{324}\rangle$, $H_{1172}=\langle\sigma_{83}, \sigma_{298}\rangle$, $H_{1263}=\langle\sigma_{108}, \sigma_{299}\rangle$
	$H_{621}=\langle\sigma_8, \sigma_{316}\rangle$, $H_{631}=\langle\sigma_8, \sigma_{538}\rangle$, $H_{753}=\langle\sigma_{17}, \sigma_{294}\rangle$, $H_{764}=\langle\sigma_{17}, \sigma_{420}\rangle$, $H_{827}=\langle\sigma_{24}, \sigma_{291}\rangle$, $H_{836}=\langle\sigma_{24}, \sigma_{417}\rangle$, $H_{864}=\langle\sigma_{26}, \sigma_{124}\rangle$, $H_{1028}=\langle\sigma_{56}, \sigma_{136}\rangle$, $H_{1160}=\langle\sigma_{83}, \sigma_{132}\rangle$, $H_{1254}=\langle\sigma_{108}, \sigma_{129}\rangle$
48	$H_{382}=\langle\sigma_2, \sigma_{129}\rangle$, $H_{395}=\langle\sigma_2, \sigma_{207}\rangle$, $H_{403}=\langle\sigma_2, \sigma_{291}\rangle$, $H_{405}=\langle\sigma_2, \sigma_{303}\rangle$, $H_{415}=\langle\sigma_2, \sigma_{417}\rangle$, $H_{416}=\langle\sigma_2, \sigma_{421}\rangle$, $H_{453}=\langle\sigma_3, \sigma_{188}\rangle$, $H_{465}=\langle\sigma_3, \sigma_{350}\rangle$, $H_{480}=\langle\sigma_3, \sigma_{664}\rangle$, $H_{523}=\langle\sigma_6, \sigma_{181}\rangle$, $H_{536}=\langle\sigma_6, \sigma_{325}\rangle$, $H_{552}=\langle\sigma_6, \sigma_{543}\rangle$, $H_{564}=\langle\sigma_7, \sigma_{146}\rangle$, $H_{694}=\langle\sigma_{15}, \sigma_{150}\rangle$, $H_{781}=\langle\sigma_{22}, \sigma_{147}\rangle$
	$H_{623}=\langle\sigma_8, \sigma_{321}\rangle$, $H_{627}=\langle\sigma_8, \sigma_{346}\rangle$, $H_{754}=\langle\sigma_{17}, \sigma_{295}\rangle$, $H_{872}=\langle\sigma_{26}, \sigma_{154}\rangle$, $H_{873}=\langle\sigma_{26}, \sigma_{155}\rangle$, $H_{904}=\langle\sigma_{27}, \sigma_{163}\rangle$, $H_{905}=\langle\sigma_{27}, \sigma_{167}\rangle$, $H_{932}=\langle\sigma_{30}, \sigma_{158}\rangle$, $H_{933}=\langle\sigma_{30}, \sigma_{162}\rangle$, $H_{1032}=\langle\sigma_{56}, \sigma_{159}\rangle$, $H_{1034}=\langle\sigma_{56}, \sigma_{166}\rangle$, $H_{1086}=\langle\sigma_{61}, \sigma_{185}\rangle$, $H_{1112}=\langle\sigma_{68}, \sigma_{192}\rangle$, $H_{1165}=\langle\sigma_{83}, \sigma_{151}\rangle$, $H_{1213}=\langle\sigma_{95}, \sigma_{169}\rangle$
60	$H_{485}=\langle\sigma_4, \sigma_{31}\rangle$, $H_{492}=\langle\sigma_4, \sigma_{175}\rangle$, $H_{494}=\langle\sigma_4, \sigma_{271}\rangle$, $H_{640}=\langle\sigma_9, \sigma_{145}\rangle$, $H_{672}=\langle\sigma_{12}, \sigma_{145}\rangle$, $H_{721}=\langle\sigma_{16}, \sigma_{145}\rangle$
	$H_{603}=\langle\sigma_8, \sigma_{148}\rangle$, $H_{604}=\langle\sigma_8, \sigma_{149}\rangle$, $H_{741}=\langle\sigma_{17}, \sigma_{148}\rangle$, $H_{742}=\langle\sigma_{17}, \sigma_{149}\rangle$, $H_{815}=\langle\sigma_{24}, \sigma_{148}\rangle$, $H_{816}=\langle\sigma_{24}, \sigma_{149}\rangle$
72	$H_{389}=\langle\sigma_2, \sigma_{161}\rangle$, $H_{393}=\langle\sigma_2, \sigma_{197}\rangle$, $H_{409}=\langle\sigma_2, \sigma_{323}\rangle$, $H_{419}=\langle\sigma_2, \sigma_{453}\rangle$, $H_{447}=\langle\sigma_3, \sigma_{152}\rangle$, $H_{449}=\langle\sigma_3, \sigma_{170}\rangle$, $H_{460}=\langle\sigma_3, \sigma_{296}\rangle$, $H_{519}=\langle\sigma_6, \sigma_{152}\rangle$, $H_{521}=\langle\sigma_6, \sigma_{170}\rangle$, $H_{532}=\langle\sigma_6, \sigma_{296}\rangle$
120	$H_{370}=\langle\sigma_2, \sigma_{33}\rangle$, $H_{388}=\langle\sigma_2, \sigma_{159}\rangle$, $H_{391}=\langle\sigma_2, \sigma_{177}\rangle$, $H_{400}=\langle\sigma_2, \sigma_{273}\rangle$, $H_{446}=\langle\sigma_3, \sigma_{151}\rangle$, $H_{518}=\langle\sigma_6, \sigma_{151}\rangle$
	$H_{605}=\langle\sigma_8, \sigma_{154}\rangle$, $H_{606}=\langle\sigma_8, \sigma_{155}\rangle$, $H_{655}=\langle\sigma_{10}, \sigma_{148}\rangle$, $H_{656}=\langle\sigma_{10}, \sigma_{149}\rangle$, $H_{664}=\langle\sigma_{11}, \sigma_{148}\rangle$, $H_{665}=\langle\sigma_{11}, \sigma_{149}\rangle$
360	$H_{491}=\langle\sigma_4, \sigma_{152}\rangle$
720	$H_{387}=\langle\sigma_2, \sigma_{153}\rangle$

6次対称群の部分群のうち，可移である以下の15個の共役類について，交換子群の列を示す。

H_{94}(位数6)の場合：$\{H_{94}, H_1$(単位群)$\}$

H_{1321}(位数6)の場合：$\{H_{1321}, H_{301}$(位数3, H_{88}の共役類), H_1(単位群)$\}$

H_{619}(位数12)の場合：$\{H_{619}, H_{598}$(位数4), H_1(単位群)$\}$

H_{622}(位数12)の場合：$\{H_{622}, H_{325}$(位数3, H_{88}の共役類), H_1(単位群)$\}$

H_{500}(位数18)の場合：$\{H_{500}, H_{89}$(位数3, H_{88}の共役類), H_1(単位群)$\}$

H_{396}(位数24)の場合：$\{H_{396}, H_{1040}$(位数4, H_{598}の共役類), H_1(単位群)$\}$

H_{624}(位数24)の場合：$\{H_{624}, H_{758}$(位数12, H_{619}の共役類), H_{738}(位数4, H_{598}の共役類), H_1(単位群)$\}$

H_{659}(位数24)の場合：$\{H_{659}, H_{758}$(位数12, H_{619}の共役類), H_{738}(位数4, H_{598}の共役類), H_1(単位群)$\}$

H_{501}(位数36)の場合：$\{H_{501}, H_{490}$(位数9), H_1(単位群)$\}$

H_{608}(位数36)の場合：$\{H_{608}, H_{1153}$(位数9, H_{490}の共役類), H_1(単位群)$\}$

H_{623}(位数48)の場合：$\{H_{623}, H_{758}$(位数12, H_{619}の共役類), H_{738}(位数4, H_{598}の共役類), H_1(単位群)$\}$

H_{603}(位数60)の場合：$\{H_{603}\}$

H_{389}(位数72)の場合：$\{H_{389}, H_{1422}$(位数18, H_{1397}の共役類), H_{1153}(位数9, H_{490}の共役類), H_1(単位群)$\}$

H_{491}(位数360)の場合：$\{H_{491}\}$

H_{387}(位数720)の場合：$\{H_{387}, H_{491}$(位数360)$\}$

これより，可移で可解な部分群(既約で可解な6次方程式のガロア群に対応する)は，H_{94}(位数6)，H_{1321}(位数6)，H_{619}(位数12)，H_{622}(位数12)，H_{500}(位数18)，H_{396}(位数24)，H_{624}(位数24)，H_{659}(位数24)，H_{501}(位数36)，H_{608}(位数36)，H_{623}(位数48)，H_{389}(位数72)とそれらの共役類である。

5. ガロア群の組成列

有限群Gが代数方程式のガロア群である場合に，その組成列$G=G_0\supset G_1\supset\cdots\supset G_s$を求める方法を示す。ここで，$G_k$($k$=1, 2, …, s)はG_{k-1}の真部分群で最大の正規部分群とする。最後のG_sは単位群である。k番目の組成列$G_{k-1}\supset G_k$において，G_{k-1}からG_kを求めるには，第1節で示した部分群の計算法において，部分群を求めるところを正規部分群を求めるように変更するだけでよい。これには，手順(1)において，σ_iから生成される部分群$\langle\sigma_i\rangle$を，σ_iを含む最小の正規部分群$\ll\sigma_i\gg$(本稿だけで用いる表記である)に変更するだけでよい。これには，まず$H=\{\sigma_i\}$とし，以下の2つの処理を繰り返すことにより，Hに元を追加していく。

(1) $\sigma^{-1}\tau\sigma$($\sigma\in G_{k-1}$，$\tau\in H$)でHに含まれないものがあれば，これをHに追加する。

(2) $\tau\tau'$($\tau,\tau'\in H$)でHに含まれないものがあれば，これをHに追加する。

Hに追加される元がなくなれば，上の2つの処理を終了する。このときのHを$\ll\sigma_i\gg$とする。手順(2)，(3)は変更する必要はない。正規部分群から生成される部分群は必ず正規部分群となるからである。

以下に示すのは，与えられた有限群の組成列$G[0], G[1], G[2], \cdots$を求めるアルゴリズムである。

```
与えられた有限群をG[0]とする。
for(k=1; |G[k-1]|>1; k++){
  G[k-1]のすべての正規部分群H[1], H[2], …, H[c]を求める。
  G[k]={σ1};
  for(i=1; i<=c; i++){
    if(|G[k-1]|>|H[i]| && |H[i]|>|G[k]|) G[k]=H[i];
  }
}
```

(例) $G=H_{1397}$(6次対称群の部分群の1つ)の場合

この場合はn=6，N=18で，Gは以下のように表される。

$$G=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}, \sigma_{16}, \sigma_{17}, \sigma_{18}\}$$
$$=\{\{1,2,3,4,5,6\}, \{1,2,3,5,6,4\}, \{1,2,3,6,4,5\}, \{1,3,2,4,6,5\}, \{1,3,2,5,4,6\},$$
$$\{1,3,2,6,5,4\}, \{2,1,3,4,6,5\}, \{2,1,3,5,4,6\}, \{2,1,3,6,5,4\}, \{2,3,1,4,5,6\},$$
$$\{2,3,1,5,6,4\}, \{2,3,1,6,4,5\}, \{3,1,2,4,5,6\}, \{3,1,2,5,6,4\}, \{3,1,2,6,4,5\},$$
$$\{3,2,1,4,6,5\}, \{3,2,1,5,4,6\}, \{3,2,1,6,5,4\}\}$$

≪第1段階≫

G_0の正規部分群は以下の7個である。

$$H_1=\ll\sigma_1\gg=\{\sigma_1\},\quad H_2=\ll\sigma_2\gg=\{\sigma_1, \sigma_2, \sigma_3\}$$
$$H_3=\ll\sigma_4\gg=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}, \sigma_{16}, \sigma_{17}, \sigma_{18}\}$$
$$H_4=\ll\sigma_{10}\gg=\{\sigma_1, \sigma_{10}, \sigma_{13}\},\quad H_5=\ll\sigma_{11}\gg=\{\sigma_1, \sigma_{11}, \sigma_{15}\},\quad H_6=\ll\sigma_{12}\gg=\{\sigma_1, \sigma_{12}, \sigma_{14}\}$$
$$H_7=\ll\sigma_2, \sigma_{10}\gg=\{\sigma_1, \sigma_2, \sigma_3, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}\}$$

これより，$G_1=H_7=\ll\sigma_2, \sigma_{10}\gg=\{\sigma_1, \sigma_2, \sigma_3, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}\}$とする。

≪第2段階≫

G_1の正規部分群は以下の6個である。

$H_1=\langle\!\langle\sigma_1\rangle\!\rangle=\{\sigma_1\}$，$H_2=\langle\!\langle\sigma_2\rangle\!\rangle=\{\sigma_1, \sigma_2, \sigma_3\}$，$H_3=\langle\!\langle\sigma_{10}\rangle\!\rangle=\{\sigma_1, \sigma_{10}, \sigma_{13}\}$，$H_4=\langle\!\langle\sigma_{11}\rangle\!\rangle=\{\sigma_1, \sigma_{11}, \sigma_{15}\}$

$H_5=\langle\!\langle\sigma_{12}\rangle\!\rangle=\{\sigma_1, \sigma_{12}, \sigma_{14}\}$，$H_6=\langle\!\langle\sigma_2, \sigma_{10}\rangle\!\rangle=\{\sigma_1, \sigma_2, \sigma_3, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}\}$

これより，$G_2=H_2=\langle\!\langle\sigma_2\rangle\!\rangle=\{\sigma_1, \sigma_2, \sigma_3\}$とする。

≪第3段階≫

G_2の正規部分群は以下の2個である。

$H_1=\langle\!\langle\sigma_1\rangle\!\rangle=\{\sigma_1\}$，$H_2=\langle\!\langle\sigma_2\rangle\!\rangle=\{\sigma_1, \sigma_2, \sigma_3\}$

これより，$G_3=H_1=\langle\!\langle\sigma_1\rangle\!\rangle=\{\sigma_1\}$とする。

以上より，組成列は以下のようになる。

$G_0 \supset G_1 \supset G_2 \supset G_3$

ここで

$G_0=\{\sigma_1, \sigma_2, \sigma_3, \sigma_4, \sigma_5, \sigma_6, \sigma_7, \sigma_8, \sigma_9, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}, \sigma_{16}, \sigma_{17}, \sigma_{18}\}$

$G_1=\{\sigma_1, \sigma_2, \sigma_3, \sigma_{10}, \sigma_{11}, \sigma_{12}, \sigma_{13}, \sigma_{14}, \sigma_{15}\}$

$G_2=\{\sigma_1, \sigma_2, \sigma_3\}$

$G_3=\{\sigma_1\}$

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