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Artin Indicatorfor the Groups SL(2,5^3) and SL(2,5^5)

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Abstract
In this work the Artin indicator for the groups*SL(2,5^3)* and *SL(2,5^5)*from the character table of rational representations and the induced characters table.

Keywords: Rationalcharacter table, induced characters table, Artin indicator.

1. Introduction

The group of all matrices of determinant 1 is $\mathcal{SL}(n,\mathrm{F})$, [1] and [2], searchers in [3] define the representation of the group.In this work we compute the Artin indicator for the groups $\mathcal{SL}(2,5^3)$ and $\mathcal{SL}(2,5^5)$.

In this work we compute the Artin indicator for the groups $\mathcal{SL}(2,3^4)$ and $\mathcal{SL}(2,3^6)$.

2. The Concepts

The relationships that we extracted above represent a complex analysis of all the components of technologies Theorem2.1:[1]

$$\left|\ \mathcal{SL}(2,q^n)\right| = q^n\ (q^{2n}-1).$$

Definition 2.4: [4]Let H be a cyclic subgroup of a group G, and ϕ be a class function of H. Then

$$\phi\uparrow^{G}(g)=\frac{\left|C_G(g)\right|}{\left|C_H(g)\right|}\sum_{i=1}^{m}\phi(x_i)$$

The character induced from the principal character of cyclic subgroups of G is Artin character.

Definition 2.5: [5]The character induced from the principal character of a cyclic subgroups of G is called Artin character.

Definition 2.6: [5]Let G be a finite group and let χ be any rational valued character on G. The smallest positive number n such that,

$$n\chi = \sum_c a_c \phi_c$$

where $a_c \in Z$ and ϕ_c is Artin character, is called the Artin exponent of G and denoted by A(G).

3. The Results

Authors in [4] and [7-8] study the character table of rational representations for the group $\mathcal{SL}(2,p)$ we apply that idea and compute the character table of rational representations for the groups $\mathcal{SL}(2,3^4)$ and $\mathcal{SL}(2,3^6)$. Also we apply the same idea in [4] and [6] to compute the Artin indicator for the same groups.

3.1. The results for the group $\mathcal{SL}(2,3^4)$

The character table of rational representations for the group $\mathcal{SL}(2,3^4)$ is

C_g	1	z	$c=d$	$zc=zd$	a	a^2	a^4	a^{31}
$\|C_g\|$	1	1	7812	7812	15750	15750	15750	15750
$\|C_G(g)\|$	1953000	1953000	250	250	124	124	124	124
1_G	1	1	1	1	1	1	1	1
ψ	125	125	0	0	1	1	1	1
χ_1	7560	-7560	60	-60	0	4	-4	0
χ_2	1890	1890	15	15	1	-1	0	-30
χ_4	1890	1890	15	15	-1	0	0	30
χ_{31}	252	-252	2	-2	0	-4	4	4
θ_1	4464	-4464	-36	36	0	0	0	0
θ_2	2232	2232	-81	-81	0	0	0	0
θ_3	1488	-1488	-12	12	0	0	0	0
θ_6	744	744	-6	-6	0	0	0	0
θ_7	744	-744	-6	6	0	0	0	0
θ_9	744	-744	-6	6	0	0	0	0
θ_{14}	372	372	-3	-3	0	0	0	0
θ_{18}	372	372	-3	-3	0	0	0	0
θ_{21}	248	-248	-2	2	0	0	0	0
θ_{42}	124	124	-1	-1	0	0	0	0
ξ	126	126	1	1	-2	2	2	-2
η	248	-248	-1	1	0	0	0	0

C_g	b	b^2	b^3	b^6	b^7	b^9	b^{14}	b^{18}	b^{21}	b^{42}
$\|C_g\|$	15500	15500	15500	15500	15500	15500	15500	15500	15500	15500
$\|C_G(g)\|$	126	126	126	126	126	126	126	126	126	126
1_G	1	1	1	1	1	1	1	1	1	1
ψ	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
χ_1	0	0	0	0	0	0	0	0	0	0
χ_2	0	0	0	0	0	0	0	0	0	0
χ_4	0	0	0	0	0	0	0	0	0	0
χ_{31}	0	0	0	0	0	0	0	0	0	0
θ_1	0	0	6	-6	0	-12	0	12	-36	36
θ_2	0	0	-3	-9	0	6	9	0	18	36
θ_3	2	-2	-4	4	-12	6	12	24	24	-24
θ_6	-1	-3	2	0	6	12	12	-12	-12	-12
θ_7	0	0	-6	6	6	12	-12	-12	-12	-12
θ_9	-2	2	6	12	12	12	-12	-12	-12	-12
θ_{14}	0	0	3	6	-6	-6	-6	-6	-6	-6
θ_{18}	1	0	6	-6	-6	-6	-6	-6	-6	-6
θ_{21}	-2	2	4	-4	-4	-4	-4	-4	-4	-4
θ_{42}	1	2	-2	-2	-2	-2	-2	-2	-2	-2

ξ	0	0	0	0	0	0	0	0	0	0
η	4	-4	4	-4	4	4	-4	-4	4	-4

The Artin character table for the group $\mathcal{SL}(2,5^3)$ is

C_g	**1**	***z***	***c=d***	***zc=zd***	***a***	a^2	a^4	a^{31}
$\|C_g\|$	**1**	**1**	**7812**	**7812**	**15750**	**15750**	**15750**	**15750**
$\|C_G(g)\|$	**1953000**	**1953000**	**250**	**250**	**124**	**124**	**124**	**124**
Φ_1	1953000	0	0	0	0	0	0	0
Φ_2	390600	390600	0	0	0	0	0	0
Φ_3	15624	0	2	0	0	0	0	0
Φ_4	15624	7812	3	3	0	0	0	0
Φ_5	15750	31500	0	0	2	0	0	0
Φ_6	31500	63000	0	0	0	4	0	0
Φ_7	63000	0	0	0	0	0	8	0
Φ_8	488250	976500	0	0	0	0	0	62
Φ_9	31000	62000	0	0	0	0	0	0
Φ_{10}	62000	0	0	0	0	0	0	0
Φ_{11}	93000	186000	0	0	0	0	0	0
Φ_{12}	186000	0	0	0	0	0	0	0
Φ_{13}	217000	434000	0	0	0	0	0	0
Φ_{14}	279000	558000	0	0	0	0	0	0
Φ_{15}	434000	0	0	0	0	0	0	0
Φ_{16}	558000	0	0	0	0	0	0	0
Φ_{17}	651000	1302000	0	0	0	0	0	0
Φ_{18}	1302000	0	0	0	0	0	0	0

C_g	***b***	b^2	b^3	b^6	b^7	b^9	b^{14}	b^{18}	b^{21}	b^{42}
$\|C_g\|$	**15500**	**15500**	**15500**	**15500**	**15500**	**15500**	**15500**	**15500**	**15500**	**15500**
$\|C_G(g)\|$	**126**	**126**	**126**	**126**	**126**	**126**	**126**	**126**	**126**	**126**
Φ_1	0	0	0	0	0	0	0	0	0	0
Φ_2	0	0	0	0	0	0	0	0	0	0
Φ_3	0	0	0	0	0	0	0	0	0	0
Φ_4	0	0	0	0	0	0	0	0	0	0
Φ_5	0	0	0	0	0	0	0	0	0	0
Φ_6	0	0	0	0	0	0	0	0	0	0
Φ_7	0	0	0	0	0	0	0	0	0	0
Φ_8	0	0	0	0	0	0	0	0	0	0
Φ_9	2	0	0	0	0	0	0	0	0	0
Φ_{10}	0	2	0	0	0	0	0	0	0	0
Φ_{11}	0	0	6	0	0	0	0	0	0	0
Φ_{12}	0	0	0	12	0	0	0	0	0	0
Φ_{13}	0	0	0	0	14	0	0	0	0	0
Φ_{14}	0	0	0	0	0	18		0	0	0
Φ_{15}	0	0	0	0	0	0	28	0	0	0
Φ_{16}	0	0	0	0	0	0	0	36	0	0
Φ_{17}	0	0	0	0	0	0	0	0	42	0
Φ_{18}	0	0	0	0	0	0	0	0	0	84

Hence, we written the rational valued characters in the first tables as a linear combination of induced characters in the second table

$1=\frac{1}{84}\Phi_{18}+\frac{1}{42}\Phi_{17}+\frac{1}{36}\Phi_{16}+\frac{1}{28}\Phi_{15}+\frac{1}{18}\Phi_{14}+\frac{1}{14}\Phi_{13}+\frac{1}{14}\Phi_{12}+\frac{1}{12}\Phi_{11}+\frac{1}{6}\Phi_{10}+\frac{1}{2}\Phi_{9}+\frac{1}{2}\Phi_{8}+\frac{1}{62}\Phi_{7}+\frac{1}{8}\Phi_{6}+\frac{1}{4}\Phi_{5}+\frac{1}{2}\Phi_{4}+\frac{1}{3}\Phi_{3}$
$-\frac{20453}{390600}\Phi_{2}+\frac{5646}{1953000}\Phi_{1}$

$\Psi=-\frac{1}{84}\Phi_{18}-\frac{1}{42}\Phi_{17}-\frac{1}{36}\Phi_{16}-\frac{1}{28}\Phi_{15}-\frac{1}{18}\Phi_{14}-\frac{1}{14}\Phi_{13}-\frac{1}{12}\Phi_{12}-\frac{1}{6}\Phi_{11}-\frac{1}{2}\Phi_{10}-\frac{1}{2}\Phi_{9}+\frac{1}{62}\Phi_{8}+\frac{1}{8}\Phi_{7}+\frac{1}{4}\Phi_{6}+\frac{1}{2}\Phi_{5}+\frac{107875}{390600}$
$\Phi_{2}+\frac{247000}{1953000}\Phi_{1}$

$\chi_{1}=-\frac{1}{2}\Phi_{7}+\Phi_{6}-20\Phi_{4}+60\Phi_{3}+\frac{85680}{390600}\Phi_{2}-\frac{703080}{1953000}\Phi_{1}$

$\chi_{2}=-0.48387\Phi_{8}-\frac{1}{4}\Phi_{6}+\frac{1}{2}\Phi_{5}+5\Phi_{4}-1.1145161290066\Phi_{2}-0.3048387096671\Phi_{1}$

$\chi_{4}=0.48387\Phi_{8}-\frac{1}{2}\Phi_{5}+5\Phi_{4}-1.2645135816692\Phi_{2}-0.4088702163338\Phi_{1}$

$\chi_{31}=0.06452\Phi_{8}+\frac{1}{2}\Phi_{7}-\Phi-0.66667\Phi_{4}+2\Phi_{3}+0.012683681618\Phi_{2}-0.241308714183\Phi_{1}$

$\theta_{1}=0.42857\Phi_{18}-0.85714\Phi_{17}+\frac{1}{3}\Phi_{16}-0.66667\Phi_{14}-\frac{1}{2}\Phi_{12}+\Phi_{11}+12\Phi_{4}-36\Phi_{3}+3.3129\Phi_{2}+0.8586713108038$
Φ_{1}

$\theta_{2}=0.42857\Phi_{18}+0.42857\Phi_{17}+0.32143\Phi_{15}+\frac{1}{3}\Phi_{14}-0.75\Phi_{12}-\frac{1}{2}\Phi_{11}-6\Phi_{3}-0.3757453661034\Phi_{2}$
$-0.1757018381976\Phi_{1}$

$\theta_{3}=-0.28571\Phi_{18}+0.57143\Phi_{17}+0.66667\Phi_{16}+0.42857\Phi_{15}+\frac{1}{3}\Phi_{14}-0.85714\Phi_{13}+\frac{1}{3}\Phi_{12}-0.66667\Phi_{11}-\Phi_{10}+\Phi_{9}+$
$4\Phi_{4}-12\Phi_{3}-0.8774626984126\Phi_{2}-0.2530801894521\Phi_{1}$

$\theta_{6}=-\frac{1}{7}\Phi_{18}-0.28571\Phi_{17}$
$-\frac{1}{3}\Phi_{16}+0.42857\Phi_{15}+0.66667\Phi_{14}+0.42857\Phi_{13}+\frac{1}{3}\Phi_{11}-1.5\Phi_{10}-\frac{1}{2}\Phi_{9}-2\Phi_{3}-0.1166841269841\Phi_{2}+0.0741998617511\Phi_{1}$

$\theta_{7}=-\frac{1}{7}\Phi_{18}-0.28571\Phi_{17}-\frac{1}{3}\Phi_{16}-0.42857\Phi_{15}+0.66667\Phi_{14}+0.42857\Phi_{13}+\frac{1}{2}\Phi_{12}-\Phi_{11}+2\Phi_{4}-6\Phi_{3}-0.0412222222222\Phi_{2}+0.2559452585765\Phi_{1}$

$\theta_{9}=-\frac{1}{7}\Phi_{18}-0.28571\Phi_{17}-\frac{1}{3}\Phi_{16}-0.42857\Phi_{15}+0.66667\Phi_{14}+0.85714\Phi_{13}+\Phi_{12}+\Phi_{11}+\Phi_{10}-\Phi_{9}+2\Phi_{4}-6\Phi_{3}-1.3517618023553\Phi_{2}-0.3076094828469\Phi_{1}$

$\theta_{14}=\frac{1}{14}\Phi_{18}-\frac{1}{7}\Phi_{17}-\frac{1}{6}\Phi_{16}-0.21429\Phi_{15}-\frac{1}{3}\Phi_{14}-0.42857\Phi_{13}+\frac{1}{2}\Phi_{12}+\frac{1}{2}\Phi_{11}-\Phi_{4}-1.5\Phi_{3}+1.2114269841269\Phi_{2}$
$+0.448751176472\Phi_{1}$

$\theta_{18}=-\frac{1}{14}\Phi_{18}-\frac{1}{7}\Phi_{17}-\frac{1}{6}\Phi_{16}-0.21429\Phi_{15}-\frac{1}{3}\Phi_{14}-0.42857\Phi_{13}-\frac{1}{2}\Phi_{12}+\Phi_{11}+\frac{1}{2}\Phi_{9}-\Phi_{4}-1.5\Phi_{3}+0.8939666666666\Phi_{2}+0.448751176472\Phi_{1}$

$\theta_{21}=-\frac{1}{21}\Phi_{18}-0.9524\Phi_{17}-\frac{1}{9}\Phi_{16}-$
$\frac{1}{7}\Phi_{15}-0.22222\Phi_{14}-0.28571\Phi_{13}-\frac{1}{3}\Phi_{12}+0.66667\Phi_{11}+\Phi_{10}-\Phi_{9}+0.66667\Phi_{4}-2\Phi_{3}+0.779679298259\Phi_{2}+1.5277120286123\Phi_{1}$

$\theta_{42}=-\frac{1}{42}\Phi_{18}-\frac{1}{21}\Phi_{17}-\frac{1}{18}\Phi_{16}-\frac{1}{14}\Phi_{15}-\frac{1}{9}\Phi_{14}-\frac{1}{7}\Phi_{13}-\frac{1}{6}\Phi_{12}-\frac{1}{3}\Phi_{11}+\Phi_{10}+\frac{1}{2}\Phi_{9}-\frac{1}{3}\Phi_{4}+0.5625396825396\Phi_{2}+0.2025396825396\Phi_{1}$

$\zeta=-\frac{\mathbf{1}}{\mathbf{31}}\Phi_{8}+\frac{1}{4}\Phi_{7}+\frac{1}{2}\Phi_{6}-\Phi_{5}+\frac{1}{3}\Phi_{4}+0.743010752688\Phi_{2}+0.012580645161\Phi_{1}$

$\eta=-\frac{1}{21}\Phi_{18+}0.9524\Phi_{17}-\frac{1}{9}\Phi_{16}-\frac{1}{7}\Phi_{15+}0.22222\Phi_{14+}0.28571\Phi_{13}-\frac{1}{3}\Phi_{12+}0.66667\Phi_{11}-2\Phi_{10}+2\Phi_9+\frac{1}{3}\Phi_4-\Phi_3-4.4518031746031\Phi_2-1.1388742857142\Phi_1$

Therefore$\mathcal{A}(\mathcal{SL}(2,5^3))=1953000\chi_1$

3.2. The results for the group $\mathcal{SL}(2,3^6)$

The character table of rational representations for the group $\mathcal{SL}(2,3^6)$ is

C_g	1	z	c=d	zc=zd	a	a^2	a^4	a^7	a^8	a^{13}	a^{14}	a^{26}
$\|C_g\|$	1	1	265720	265720	532170	532170	532170	532170	532170	532170	532170	532170
$\|C_G(g)\|$	387419760	387419760	1458	1458	728	728	728	728	728	728	728	728
1_G	1	1	1	1	1	1	1	1	1	1	1	1
ψ	729	729	0	0	1	1	1	1	1	1	1	1
χ_1	210240	-210240	288	-288	0	0	-1152	0	1152	0	0	0
χ_2	52560	52560	72	72	0	-144	144	0	0	0	864	1728
χ_4	26280	26280	36	36	-36	36	0	216	216	432	-216	-432
χ_7	35040	-35040	48	-48	0	0	192	288	-192	0	-384	0
χ_8	26280	26280	36	36	36	0	216	-216	-648	-432	-432	0
χ_{13}	17520	-17520	24	-24	0	0	96	0	-96	0	0	-576
χ_{14}	8760	8760	12	12	0	24	-24	-48	-48	0	0	-288
χ_{26}	4380	4380	6	6	0	12	-12	0	0	-72	-72	72
χ_{28}	4380	4380	6	6	6	-6	-12	0	-36	-72	-72	72
χ_{52}	2190	2190	3	3	3	-3	0	-18	-18	18	18	18
χ_{56}	4380	4380	6	6	-6	-12	-36	-72	-72	72	72	72
χ_{91}	2920	-2920	4	-4	0	0	-16	16	16	16	16	16
χ_{104}	2190	2190	3	3	-3	0	-18	18	18	18	18	18
χ_{182}	730	730	1	1	0	-2	2	2	2	2	2	2
θ_1	209664	-209664	-288	288	0	0	0	0	0	0	0	0
θ_2	104832	104832	-144	-144	0	0	0	0	0	0	0	0
θ_5	52416	-52416	-72	72	0	0	0	0	0	0	0	0
θ_{10}	26208	26208	-36	-36	0	0	0	0	0	0	0	0
θ_{73}	2912	-2912	-4	4	0	0	0	0	0	0	0	0
θ_{146}	1456	1456	-2	-2	0	0	0	0	0	0	0	0
ξ	730	730	1	1	-2	2	2	-2	2	-2	2	2
η	1456	-1456	-1	1	0	0	0	0	0	0	0	0

C_g	a^{28}	a^{52}	a^{56}	a^{91}	a^{104}	a^{182}	b^1	b^2	b^5	b^{10}	b^{73}	b^{146}
$\|C_g\|$	532170	532170	532170	532170	532170	532170	530712	530712	530712	530712	530712	530712
$\|C_G(g)\|$	728	728	728	728	728	728	730	730	730	730	730	730
1_G	1	1	1	1	1	1	1	1	1	1	1	1
ψ	1	1	1	1	1	1	-1	-1	-1	-1	-1	-1
χ_1	6912	13824	-6912	0	-13824	0	0	0	0	0	0	0
χ_2	-864	-1738	-1738	0	0	-10368	0	0	0	0	0	0
χ_4	-432	0	-1296	-2592	-2592	2592	0	0	0	0	0	0
χ_7	0	-2304	-2304	2304	2304	2304	0	0	0	0	0	0
χ_8	-1296	-2592	-2592	2592	2592	2592	0	0	0	0	0	0
χ_{13}	-576	576	576	576	576	576	0	0	0	0	0	0
χ_{14}	-288	288	288	288	288	288	0	0	0	0	0	0
χ_{26}	72	72	72	72	72	72	0	0	0	0	0	0
χ_{28}	72	72	72	72	72	72	0	0	0	0	0	0
χ_{52}	18	18	18	18	18	18	0	0	0	0	0	0
χ_{56}	72	72	72	72	72	72	0	0	0	0	0	0
χ_{91}	16	16	16	16	16	16	0	0	0	0	0	0
χ_{104}	18	18	18	18	18	18	0	0	0	0	0	0
χ_{182}	2	2	2	2	2	2	0	0	0	0	0	0
θ_1	0	0	0	0	0	0	-288	-288	-1152	-1152	-20736	20736
θ_2	0	0	0	0	0	0	-144	576	576	1152	10368	20736
θ_5	0	0	0	0	0	0	-72	72	648	-648	5184	-5184
θ_{10}	0	0	0	0	0	0	36	72	-324	432	-2592	-2592
θ_{73}	0	0	0	0	0	0	-4	4	16	-16	-16	-16
θ_{146}	0	0	0	0	0	0	2	4	-8	-8	-8	-8
ξ	2	2	2	-2	2	2	0	0	0	0	0	0

η	0	0	0	0	0	0	4	-4	4	-4	4	-4

The Artincharacter table for the group $\mathcal{SL}(2,3^6)$ is

C g	**1**	***z***	***c=d***	***zc=zd***	***a***	a^2	a^4	a^7	a^8	a^{13}	a^{14}	a^{26}
|C$_g$|	**1**	**1**	**265720**	**265720**	**532170**	**532170**	**532170**	**532170**	**532170**	**532170**	**532170**	**532170**
|C$_G$(*g*)|	**387419760**	**387419760**	**1458**	**1458**	**728**	**728**	**728**	**728**	**728**	**728**	**728**	**728**
Φ_1	387419760	0	0	0	0	0	0	0	0	0	0	0
Φ_2	64569960	64569960	0	0	0	0	0	0	0	0	0	0
Φ_3	531440	0	2	0	0	0	0	0	0	0	0	0
Φ_4	531440	797160	2	2	0	0	0	0	0	0	0	0
Φ_5	532170	1064340	0	0	2	0	0	0	0	0	0	0
Φ_6	1064340	2128680	0	0	0	4	0	0	0	0	0	0
Φ_7	2128680	0	0	0	0	0	8	0	0	0	0	0
Φ_8	3725190	7450380	0	0	0	0	0	14	0	0	0	0
Φ_9	4257360	0	0	0	0	0	0	0	16	0	0	0
Φ_{10}	6918210	13836420	0	0	0	0	0	0	0	26	0	0
Φ_{11}	7450380	0	0	0	0	0	0	0	0	0	28	0
Φ_{12}	13836420	0	0	0	0	0	0	0	0	0	0	52
Φ_{13}	14900760	0	0	0	0	0	0	0	0	0	0	0
Φ_{14}	27672840	0	0	0	0	0	0	0	0	0	0	0
Φ_{15}	29801520	0	0	0	0	0	0	0	0	0	0	0
Φ_{16}	48427470	96854940	0	0	0	0	0	0	0	0	0	0
Φ_{17}	55345680	0	0	0	0	0	0	0	0	0	0	0
Φ_{18}	96854940	0	0	0	0	0	0	0	0	0	0	0
Φ_{19}	1061424	2122848	0	0	0	0	0	0	0	0	0	0
Φ_{20}	2122848	0	0	0	0	0	0	0	0	0	0	0
Φ_{21}	5307120	10614240	0	0	0	0	0	0	0	0	0	0
Φ_{22}	10641240	0	0	0	0	0	0	0	0	0	0	0
Φ_{23}	77483952	154967904	0	0	0	0	0	0	0	0	0	0
Φ_{24}	154967904	0	0	0	0	0	0	0	0	0	0	0

g	a^{28}	a^{52}	a^{56}	a^{91}	a^{104}	a^{182}	b^1	b^2	b^5	b^{10}	b^{73}	b^{146}
|C$_g$|	**532170**	**532170**	**532170**	**532170**	**532170**	**532170**	**530712**	**530712**	**530712**	**530712**	**530712**	**530712**
|C$_G$(*g*)|	**728**	**728**	**728**	**728**	**728**	**728**	**730**	**730**	**730**	**730**	**730**	**730**
Φ_1	0	0	0	0	0	0	0	0	0	0	0	0
Φ_2	0	0	0	0	0	0	0	0	0	0	0	0
Φ_3	0	0	0	0	0	0	0	0	0	0	0	0
Φ_4	0	0	0	0	0	0	0	0	0	0	0	0
Φ_5	0	0	0	0	0	0	0	0	0	0	0	0
Φ_6	0	0	0	0	0	0	0	0	0	0	0	0
Φ_7	0	0	0	0	0	0	0	0	0	0	0	0
Φ_8	0	0	0	0	0	0	0	0	0	0	0	0
Φ_9	0	0	0	0	0	0	0	0	0	0	0	0
Φ_{10}	0	0	0	0	0	0	0	0	0	0	0	0
Φ_{11}	0	0	0	0	0	0	0	0	0	0	0	0
Φ_{12}	0	0	0	0	0	0	0	0	0	0	0	0
Φ_{13}	56	0	0	0	0	0	0	0	0	0	0	0
Φ_{14}	0	104	0	0	0	0	0	0	0	0	0	0
Φ_{15}	0	0	112	0	0	0	0	0	0	0	0	0
Φ_{16}	0	0	0	182	0	0	0	0	0	0	0	0
Φ_{17}	0	0	0	0	208	0	0	0	0	0	0	0
Φ_{18}	0	0	0	0	0	364	0	0	0	0	0	0
Φ_{19}	0	0	0	0	0	0	2	0	0	0	0	0
Φ_{20}	0	0	0	0	0	0	0	2	0	0	0	0
Φ_{21}	0	0	0	0	0	0	0	0	10	0	0	0
Φ_{22}	0	0	0	0	0	0	0	0	0	20	0	0
Φ_{23}	0	0	0	0	0	0	0	0	0	0	146	0
Φ_{24}	0	0	0	0	0	0	0	0	0	0	0	292

Hence, we written the rational valued characters in the first tables as a linear combination of induced characters in the second table

$$1=\frac{1}{292}\Phi_{24}+\frac{1}{146}\Phi_{23}+\frac{1}{20}\Phi_{22}+\frac{1}{10}\Phi_{21}+\frac{1}{2}\Phi_{20}+\frac{1}{2}\Phi_{19}+\frac{1}{364}\Phi_{18}+\frac{1}{208}\Phi_{17}+\frac{1}{182}\Phi_{16}+\frac{1}{112}\Phi_{15}+\frac{1}{104}\Phi_{14}+\frac{1}{56}\Phi_{13}+\frac{1}{52}\Phi_{12}+\frac{1}{28}\Phi_{11}+\frac{1}{26}\Phi_{10}+\frac{1}{16}\Phi_{9}+\frac{1}{14}\Phi_{8}+\frac{1}{8}\Phi_{7}+\frac{1}{4}\Phi_{6}+\frac{1}{2}\Phi_{5}+\frac{1}{2}\Phi_{4}-\frac{0.0966966838}{64569960}\Phi_{2}+\frac{0.3200308497}{387419760}\Phi_{1}$$

$\Psi=-\frac{1}{292}\Phi_{24}-\frac{1}{146}\Phi_{23}-\frac{1}{20}\Phi_{22}-\frac{1}{10}\Phi_{21}-\frac{1}{2}\Phi_{20}-\frac{1}{2}\Phi_{19}+\frac{1}{364}\Phi_{18}+\frac{1}{208}\Phi_{17}+\frac{1}{182}\Phi_{16}+\frac{1}{112}\Phi_{15}+\frac{1}{104}\Phi_{14}+\frac{1}{56}\Phi_{13}+\frac{1}{52}\Phi_{12}+\frac{1}{28}\Phi_{11}+\frac{1}{26}\Phi_{10}+\frac{1}{16}\Phi_{9}+\frac{1}{14}\Phi_{8}+\frac{1}{8}\Phi_{7}+\frac{1}{4}\Phi_{6}+\frac{1}{2}\Phi_{5}-\frac{8241.764477189857}{64569960}\Phi_{2}-\frac{1.1236073802}{387419760}\Phi_{1}$

$\chi_1=-66.46154\Phi_{17}-61.71429\Phi_{15}-132.923077\Phi_{14}+123.42857\Phi_{13}+72\Phi_{9}-144\Phi_{7}-144\Phi_{4}+288\Phi_{3}+\frac{114580800}{64569960}\Phi_{2}-\frac{18386930802050}{387419760}\Phi_{1}$

$\chi_2=-28.48352\Phi_{18}-15.51786\Phi_{15}-16.71154\Phi_{14}-15.42857\Phi_{13}+33.23077\Phi_{12}+30.85714\Phi_{11}+18\Phi_{7}-36\Phi_{6}+36\Phi_{4}+\frac{47987280}{64569960}\Phi_{2}+\frac{8.6823907941}{387419760}\Phi_{1}$

$\chi_4=7.12088\Phi_{18}-12.46154\Phi_{17}-14.24176\Phi_{16}-11.57143\Phi_{15}-7.71429\Phi_{13}-8.30769\Phi_{12}-7.71429\Phi_{11}+16.61538\Phi_{10}+13.5\Phi_{9}+15.42858\Phi_{8}+9\Phi_{6}-18\Phi_{5}+18\Phi_{4}-\frac{26.9251145625}{64569960}\Phi_{2}+\frac{7.1480607026}{387419760}\Phi_{1}$

$\chi_7=6.32967\Phi_{18}+11.7692\Phi_{17}+12.65934\Phi_{16}-20.57143\Phi_{15}-22.15385\Phi_{14}-13.71429\Phi_{11}-12\Phi_{9}+20.57143\Phi_{8}+24\Phi_{7}-24\Phi_{4}+48\Phi_{3}-\frac{21.0668829094}{64569960}\Phi_{2}+\frac{1.6918333266}{387419760}\Phi_{1}$

$\chi_8=7.12088\Phi_{18}+12.46154\Phi_{17}+14.24176\Phi_{16}-23.14296\Phi_{15}-24.92308\Phi_{14}-23.14286\Phi_{13}-15.42857\Phi_{11}-16.61538\Phi_{10}-40.5\Phi_{9}-15.42857\Phi_{8}+27+18\Phi_{5}+18\Phi_{4}-\frac{20.1009395625}{64569960}\Phi_{2}+\frac{3.1524636323}{387419760}\Phi_{1}$

$\chi_{13}=1.58242\Phi_{18}+2.76923\Phi_{17}+3.16484\Phi_{16}+5.14286\Phi_{15}+5.53846\Phi_{14}-10.28571\Phi_{13}-11.07692\Phi_{12}-6\Phi_{9}+12\Phi_{7}-12\Phi_{4}-24\Phi_{3}+\frac{3171120}{64569960}\Phi_{2}-\frac{0.8158105289}{387419760}\Phi_{1}$

$\chi_{14}=0.79121\Phi_{18}+1.38462\Phi_{17}+1.58242\Phi_{16}+2.57143\Phi_{15}+2.76923\Phi_{14}-5.14286\Phi_{13}-5.53846\Phi_{12}-3\Phi_{9}-3.42857\Phi_{8}-3\Phi_{7}+6\Phi_{6}+6\Phi_{4}-\frac{132495245}{64569960}\Phi_{2}-\frac{75038410}{387419760}\Phi_{1}$

$\chi_{26}=0.19780\Phi_{18}+0.34615\Phi_{17}+0.39560\Phi_{16}+0.64286\Phi_{15}+0.692308\Phi_{14}-1.28571\Phi_{13}+1.38462\Phi_{12}-2.57143\Phi_{11}-2.76923\Phi_{10}-1.5\Phi_{7}+3\Phi_{6}+3\Phi_{4}-\frac{0.135863874}{64569960}\Phi_{2}-\frac{1.1127652965}{387419760}\Phi_{1}$

$\chi_{28}=0.19780\Phi_{18}+0.34615\Phi_{17}+0.39560\Phi_{16}+0.64286\Phi_{15}+0.692308\Phi_{14}-1.28571\Phi_{13}+1.38462\Phi_{12}-2.57143\Phi_{11}-2.76923\Phi_{10}-2.25\Phi_{9}-1.5\Phi_{7}+1.5\Phi_{6}+3\Phi_{5}+3\Phi_{4}+\frac{1.1498372249}{64569960}\Phi_{2}-\frac{0.4100273676}{387419760}\Phi_{1}$

$\chi_{52}=0.49451\Phi_{18}+0.08654\Phi_{17}+0.09890\Phi_{16}+0.16071\Phi_{15}+0.17308\Phi_{14}+0.32143\Phi_{13}+0.34615\Phi_{12}+0.64286\Phi_{11}+0.69231\Phi_{10}-1.125\Phi_{9}-1.28571\Phi_{8}-0.75\Phi_{6}1.5\Phi_{5}+1.5\Phi_{4}-\frac{0.1668355908}{64569960}\Phi_{2}-\frac{0.1609208234}{387419760}\Phi_{1}$

$\chi_{56}=0.19780\Phi_{18}+0.34615\Phi_{17}+0.39560\Phi_{16}+0.64286\Phi_{15}+0.692308\Phi_{14}-1.28571\Phi_{13}+1.38462\Phi_{12}+2.57143\Phi_{11}+2.76923\Phi_{10}-4.5\Phi_{9}-5.14286\Phi_{8}-4.5\Phi_{7}-3\Phi_{6}-3\Phi_{5}+3\Phi_{4}-\frac{0.4820170608}{64569960}\Phi_{2}-\frac{0.0844818731}{387419760}\Phi_{1}$

$\chi_{91}=0.04396\Phi_{18}+0.07692\Phi_{17}+0.08791\Phi_{16}+0.14286\Phi_{15}+0.15385\Phi_{14}+0.28571\Phi_{13}+0.30769\Phi_{12}+0.57143\Phi_{11}+0.61538\Phi_{10}+\Phi_{9}+1.4286\Phi_{8}-2\Phi_{7}-2\Phi_{4}+4\Phi_{3}-\frac{0.3709544686}{64569960}\Phi_{2}-\frac{0.0508008205}{387419760}\Phi_{1}$

χ_{104}=0.49451 Φ_{18}+0.08654Φ_{17}+0.09890 Φ_{16}+0.16071 Φ_{15} +0.17308 Φ_{14}+0.32143Φ_{13}+0.34615Φ_{12}+0.64286Φ_{11}+0.69231Φ_{10} −1.125 Φ_9+1.28571Φ_8 −2.25Φ_7 −1.5Φ_5+1.5Φ_4 − $\frac{0.1421103161}{64569960}\Phi_2 - \frac{0.1753438179}{387419760}\Phi_1$

χ_{182}=0.00549Φ_{18}+0.00962Φ_{17}+0.01099Φ_{16}+0.01786Φ_{15} +0.01923Φ_{14}+0.03571Φ_{13}+0.03846Φ_{12} +0.7143Φ_{11} +0.7692Φ_{10}+0.125Φ_9+0.14286Φ_8 +0.25Φ_7 −0.5Φ_5+0.5Φ_4 − $\frac{0.0391297208}{64569960}\Phi_2 - \frac{0.0092718584}{387419760}\Phi_1$

θ_1 =71.01369Φ_{24} −142.02739Φ_{23} −57.6Φ_{22} −115.2Φ_{21} −144Φ_{20} −144Φ_{19} +144Φ_4 −28Φ_3 + $\frac{345.7201583351}{64569960}\Phi_2 - \frac{53.4348626927}{387419760}\Phi_1$

θ_2 =71.01369Φ_{24} +71.01369Φ_{23} +57.6Φ_{22} +57.6Φ_{21} +288Φ_{20} −72Φ_{19} −144Φ_4 − $\frac{175.7548245439}{64569960}\Phi_2 - \frac{16.8699012443}{387419760}\Phi_1$

θ_5 = −17.75342Φ_{24}+35.50685Φ_{23} −32.4Φ_{22}+648Φ_{21} +36Φ_{20} −36Φ_{19} −72Φ_3 − $\frac{192.9213613597}{64569960}\Phi_2$ − $\frac{40.3373349903}{387419760}\Phi_1$

θ_{10} = −8.87672Φ_{24} −17.75342Φ_{23}+21.6Φ_{22} −32.4Φ_{21}+36Φ_{20} +18Φ_{19} −36Φ_4 + $\frac{47.7873049051}{64569960}\Phi_2$ − $\frac{8.0788241774}{387419760}\Phi_1$

θ_{73} = −0.05479Φ_{24} − 0.10959Φ_{23} −0.8Φ_{22}+1.6Φ_{21} +2Φ_{20} − 2Φ_{19} −2Φ_4 −4Φ_3 − $\frac{0.0411048327}{64569960}\Phi_2$ − $\frac{0.0014069516}{387419760}\Phi_1$

θ_{146} = −0.02739Φ_{24} −0.05479Φ_{23} −0.4Φ_{22} −0.8Φ_{21} +2Φ_{20} + Φ_{19} −2Φ_4 + $\frac{2.548400442}{64569960}\Phi_2$ − $\frac{0.0095650435}{387419760}\Phi_1$

ζ=0.00549Φ_{18} +0.00962Φ_{17} − 0.01099Φ_{16}+0.01786Φ_{15}+0.01923Φ_{14}+0.03571Φ_{13} +0.03846Φ_{12}+0.07142Φ_{11} −0.07692Φ_{10}+0.125 Φ_9 −1014286 Φ_8+0.25Φ_7+0.5Φ_6 − Φ_5 + Φ_4 + $\frac{0.0371173299}{64569960}\Phi_2 - \frac{0.014421012}{387419760}\Phi_1$

η=− 0.01369Φ_{24}+0.02739Φ_{23}+0.2Φ_{22} +0.4Φ_{21} −2Φ_{20}+2Φ_{19}+0.5Φ_4 − Φ_3 − $\frac{0.203438238}{64569960}\Phi_2$ + $\frac{0.0279008248}{387419760}\Phi_1$

Therefore$\mathcal{A}(\mathcal{SL}(2,3^6)) = 387419760\chi_1$

4. References

[1] Mohamed.S K., (2006), On Rational-Valued Characters of Certain Types of Permutation Group, Ibn Al-Haitham Journal For Pure and Applied Sciences, Vol.19(4), pp.99-108.

[2] Saad O. B., (2019), Investigating Particular Representations for Matrix Lie GroupsSO(3) andSL(2,ℂ), Iraqi Journal of Science, Vol. 60, No. 4,pp: 856-858, https://doi.org/10.24996/ijs.2019.60.4.19.

[3] Taghreed H. M., Khawla A.Al-Z. Niran S. J., (2016), On the Representations of M-Groups, Baghdad Science Journal, Vol.13, No.2, pp. 394-401, https://doi.org/10.21123/bsj.2016.13.2.0394.

[4] Niran S. J., Hadeel H. L. & Rana N. M., (2021), Computations for the special linear group (2,49), Vol. 24, No. 6, pp. 1677-1683, Journal ofInterdisciplinaryMathematics, https://doi.org/10.1080/09720502.2021.1892273.

[5] Sigler L.E., Algebra, Springer-Verlage, Berlin, 1976.

[6] Dunya M. H., Ahmed K. M., Intidhar Z. M., (2021), Score for some Groups SUT(2,p), Int. J. Nonlinear Anal. Appl., Vol.12, No. 2, pp.1-15.

[7] Noor Alhuda S. S. andNiran S. J., 2022, Periodical split for the groups PSL(2,31) and PSL(2,37), Journal of Discrete Mathematical Sciences and Cryptography, Vol. 25, No. 2, pp. 605-608 https://doi.org/10.1080/09720529.2021.1982490.

[8] Sherouk A. K. and Niran S. J., (2022), Calculationfor the groupsSL(2,U), U=31 and 37, Journal of Discrete Mathematical Sciences and Cryptography, Vol. 25, No. 2, pp. 609-613, https://doi.org/10.1080/09720529.2021.1972614.