

# $S_{10}(2) \pmod{31}$

	blocks	defect	matrix
$G :$	1	1	$13 \times 10$
	2	0	$155_1 = \chi_2, \varphi_2$
	3	0	$341_1 = \chi_4, \varphi_4$
	4	0	$527_1 = \chi_6, \varphi_6$
	5	0	$6138_1 = \chi_7, \varphi_7$
	6	0	$11594_1 = \chi_8, \varphi_8$
	7	0	$11594_2 = \chi_9, \varphi_9$
	8	0	$11935_1 = \chi_{10}, \varphi_{10}$
	9	0	$17050_1 = \chi_{11}, \varphi_{11}$
	10	0	$17391_1 = \chi_{12}, \varphi_{12}$
	11	0	$18445_1 = \chi_{13}, \varphi_{13}$
	12	0	$28985_1 = \chi_{14}, \varphi_{14}$
	13	0	$29512_1 = \chi_{15}, \varphi_{15}$
	14	0	$40579_1 = \chi_{17}, \varphi_{17}$
	15	0	$46035_1 = \chi_{18}, \varphi_{18}$
	16	0	$46376_1 = \chi_{19}, \varphi_{19}$
	17	0	$46376_2 = \chi_{20}, \varphi_{20}$
	18	0	$52173_1 = \chi_{21}, \varphi_{22}$
	19	0	$57288_1 = \chi_{23}, \varphi_{23}$
	20	0	$57970_1 = \chi_{24}, \varphi_{24}$
	21	0	$63240_1 = \chi_{25}, \varphi_{25}$
	22	0	$81158_1 = \chi_{26}, \varphi_{26}$
	23	0	$173910_1 = \chi_{27}, \varphi_{27}$
	24	0	$184450_1 = \chi_{28}, \varphi_{28}$
	25	0	$190960_1 = \chi_{29}, \varphi_{29}$
	26	0	$202895_1 = \chi_{30}, \varphi_{30}$
	27	0	$202895_2 = \chi_{31}, \varphi_{31}$
	28	0	$202895_3 = \chi_{32}, \varphi_{32}$
	29	0	$202895_4 = \chi_{33}, \varphi_{33}$
	30	0	$231880_1 = \chi_{34}, \varphi_{34}$
	31	0	$231880_2 = \chi_{35}, \varphi_{35}$
	32	0	$278256_1 = \chi_{36}, \varphi_{36}$
	33	0	$313038_1 = \chi_{37}, \varphi_{37}$
	34	0	$365211_1 = \chi_{38}, \varphi_{38}$
	35	0	$371008_1 = \chi_{39}, \varphi_{39}$
	36	0	$381920_1 = \chi_{40}, \varphi_{40}$
	37	0	$405790_1 = \chi_{41}, \varphi_{41}$
	38	0	$405790_2 = \chi_{42}, \varphi_{42}$
	39	0	$405790_3 = \chi_{43}, \varphi_{43}$
	40	0	$405790_4 = \chi_{44}, \varphi_{44}$

	blocks	defect	matrix
	41	0	$405790_5 = \chi_{45}, \varphi_{45}$
	42	0	$417384_1 = \chi_{46}, \varphi_{46}$
	43	0	$434775_1 = \chi_{47}, \varphi_{47}$
	44	0	$515592_1 = \chi_{48}, \varphi_{48}$
	45	0	$556512_1 = \chi_{49}, \varphi_{49}$
	46	0	$649264_1 = \chi_{50}, \varphi_{50}$
	47	0	$736560_1 = \chi_{51}, \varphi_{51}$
	48	0	$782595_1 = \chi_{52}, \varphi_{52}$
	49	0	$782595_2 = \chi_{53}, \varphi_{53}$
	50	0	$811580_1 = \chi_{54}, \varphi_{54}$
	51	0	$869550_1 = \chi_{55}, \varphi_{55}$
	52	0	$944384_1 = \chi_{56}, \varphi_{56}$
	53	0	$973896_1 = \chi_{57}, \varphi_{57}$
	54	0	$973896_2 = \chi_{58}, \varphi_{58}$
	55	0	$1014475_1 = \chi_{59}, \varphi_{59}$
	56	0	$1014475_2 = \chi_{60}, \varphi_{60}$
	57	0	$1014475_3 = \chi_{61}, \varphi_{61}$
	58	0	$1095633_1 = \chi_{62}, \varphi_{62}$
	59	0	$1095633_2 = \chi_{63}, \varphi_{63}$
	60	0	$1159400_1 = \chi_{64}, \varphi_{64}$
	61	0	$1217370_1 = \chi_{65}, \varphi_{65}$
	62	0	$1298528_1 = \chi_{67}, \varphi_{67}$
	63	0	$1298528_2 = \chi_{68}, \varphi_{68}$
	64	0	$1408671_1 = \chi_{69}, \varphi_{69}$
	65	0	$1432200_1 = \chi_{70}, \varphi_{70}$
	66	0	$1473120_1 = \chi_{71}, \varphi_{71}$
	67	0	$1565190_1 = \chi_{72}, \varphi_{72}$
	68	0	$1623160_1 = \chi_{73}, \varphi_{73}$
	69	0	$1623160_2 = \chi_{74}, \varphi_{74}$
	70	0	$1623160_3 = \chi_{75}, \varphi_{75}$
	71	0	$1826055_1 = \chi_{77}, \varphi_{77}$
	72	0	$1826055_2 = \chi_{78}, \varphi_{78}$
	73	0	$1826055_3 = \chi_{79}, \varphi_{79}$
	74	0	$1826055_4 = \chi_{80}, \varphi_{80}$
	75	0	$1826055_5 = \chi_{81}, \varphi_{81}$
	76	0	$1855040_1 = \chi_{82}, \varphi_{82}$
	77	0	$1855040_2 = \chi_{83}, \varphi_{83}$
	78	0	$1947792_1 = \chi_{84}, \varphi_{84}$
	79	0	$2023680_1 = \chi_{85}, \varphi_{85}$
	80	0	$2028950_1 = \chi_{86}, \varphi_{86}$

	blocks	defect	matrix
	81	0	$2028950_2 = \chi_{87}, \varphi_{87}$
	82	0	$2028950_3 = \chi_{88}, \varphi_{88}$
	83	0	$2213400_1 = \chi_{89}, \varphi_{89}$
	84	0	$2347785_1 = \chi_{90}, \varphi_{90}$
	85	0	$2347785_2 = \chi_{91}, \varphi_{91}$
	86	0	$2434740_1 = \chi_{92}, \varphi_{92}$
	87	0	$2434740_2 = \chi_{93}, \varphi_{93}$
	88	0	$2782560_1 = \chi_{94}, \varphi_{94}$
	89	0	$2921688_1 = \chi_{95}, \varphi_{95}$
	90	0	$3055360_1 = \chi_{96}, \varphi_{96}$
	91	0	$3142656_1 = \chi_{97}, \varphi_{97}$
	92	0	$3246320_1 = \chi_{98}, \varphi_{98}$
	93	0	$3246320_2 = \chi_{99}, \varphi_{99}$
	94	0	$3246320_3 = \chi_{100}, \varphi_{100}$
	95	0	$3286899_1 = \chi_{101}, \varphi_{101}$
	96	0	$3286899_2 = \chi_{102}, \varphi_{102}$
	97	0	$3339072_1 = \chi_{103}, \varphi_{103}$
	98	0	$3478200_1 = \chi_{104}, \varphi_{104}$
	99	0	$3652110_1 = \chi_{105}, \varphi_{105}$
	100	0	$3652110_2 = \chi_{106}, \varphi_{106}$
	101	0	$4057900_1 = \chi_{107}, \varphi_{107}$
	102	0	$4382532_1 = \chi_{108}, \varphi_{108}$
	103	0	$4452096_1 = \chi_{109}, \varphi_{109}$
	104	0	$4637600_1 = \chi_{110}, \varphi_{110}$
	105	0	$4869480_1 = \chi_{111}, \varphi_{111}$
	106	0	$4869480_2 = \chi_{112}, \varphi_{112}$
	107	0	$4869480_3 = \chi_{113}, \varphi_{113}$
	108	0	$5008608_1 = \chi_{114}, \varphi_{115}$
	109	0	$5079040_1 = \chi_{115}, \varphi_{116}$
	110	0	$5478165_1 = \chi_{116}, \varphi_{117}$
	111	0	$5478165_2 = \chi_{117}, \varphi_{118}$
	112	0	$5478165_3 = \chi_{118}, \varphi_{119}$
	113	0	$5902400_1 = \chi_{119}, \varphi_{120}$
	114	0	$5936128_1 = \chi_{120}, \varphi_{121}$
	115	0	$5936128_2 = \chi_{121}, \varphi_{122}$
	116	0	$5936128_3 = \chi_{122}, \varphi_{123}$
	117	0	$6260760_1 = \chi_{124}, \varphi_{124}$
	118	0	$6260760_2 = \chi_{125}, \varphi_{125}$
	119	0	$6492640_1 = \chi_{126}, \varphi_{126}$
	120	0	$6492640_2 = \chi_{127}, \varphi_{127}$

	blocks	defect	matrix
	121	0	$6573798_1 = \chi_{128}, \varphi_{128}$
	122	0	$6956400_1 = \chi_{129}, \varphi_{129}$
	123	0	$7332864_1 = \chi_{130}, \varphi_{130}$
	124	0	$8115800_1 = \chi_{131}, \varphi_{131}$
	125	0	$8115800_2 = \chi_{132}, \varphi_{132}$
	126	0	$8115800_3 = \chi_{133}, \varphi_{133}$
	127	0	$8115800_4 = \chi_{134}, \varphi_{134}$
	128	0	$8729600_1 = \chi_{135}, \varphi_{135}$
	129	0	$8765064_1 = \chi_{136}, \varphi_{136}$
	130	0	$9130275_1 = \chi_{137}, \varphi_{137}$
	131	0	$9130275_2 = \chi_{138}, \varphi_{138}$
	132	0	$9130275_3 = \chi_{139}, \varphi_{139}$
	133	0	$9130275_4 = \chi_{140}, \varphi_{140}$
	134	0	$9738960_1 = \chi_{141}, \varphi_{141}$
	135	0	$9738960_2 = \chi_{142}, \varphi_{142}$
	136	0	$9860697_1 = \chi_{143}, \varphi_{143}$
	137	0	$10388224_1 = \chi_{144}, \varphi_{144}$
	138	0	$10956330_1 = \chi_{145}, \varphi_{145}$
	139	0	$10956330_2 = \chi_{146}, \varphi_{146}$
	140	0	$11269368_1 = \chi_{147}, \varphi_{147}$
	141	0	$11738925_1 = \chi_{148}, \varphi_{148}$
	142	0	$11738925_2 = \chi_{149}, \varphi_{149}$
	143	0	$11738925_3 = \chi_{150}, \varphi_{150}$
	144	0	$11738925_4 = \chi_{151}, \varphi_{151}$
	145	0	$11784960_1 = \chi_{152}, \varphi_{152}$
	146	0	$12521520_1 = \chi_{153}, \varphi_{153}$
	147	0	$12985280_1 = \chi_{154}, \varphi_{154}$
	148	0	$13147596_1 = \chi_{155}, \varphi_{155}$
	149	0	$13147596_2 = \chi_{156}, \varphi_{156}$
	150	0	$14501025_1 = \chi_{157}, \varphi_{157}$
	151	0	$14501025_2 = \chi_{158}, \varphi_{158}$
	152	0	$14501025_3 = \chi_{159}, \varphi_{159}$
	153	0	$14501025_4 = \chi_{160}, \varphi_{160}$
	154	0	$14608440_1 = \chi_{161}, \varphi_{162}$
	155	0	$14608440_2 = \chi_{162}, \varphi_{163}$
	156	0	$14608440_3 = \chi_{163}, \varphi_{164}$
	157	0	$14840320_1 = \chi_{164}, \varphi_{165}$
	158	0	$16231600_1 = \chi_{166}, \varphi_{166}$
	159	0	$16434495_1 = \chi_{167}, \varphi_{167}$
	160	0	$16434495_2 = \chi_{168}, \varphi_{168}$

	blocks	defect	matrix
	161	0	$16434495_3 = \chi_{169}, \varphi_{169}$
	162	0	$16434495_4 = \chi_{170}, \varphi_{170}$
	163	0	$17268736_1 = \chi_{171}, \varphi_{171}$
	164	0	$17530128_1 = \chi_{172}, \varphi_{172}$
	165	0	$18260550_1 = \chi_{173}, \varphi_{173}$
	166	0	$18260550_2 = \chi_{174}, \varphi_{174}$
	167	0	$18887680_1 = \chi_{175}, \varphi_{175}$
	168	0	$21130065_1 = \chi_{176}, \varphi_{177}$
	169	0	$21130065_2 = \chi_{177}, \varphi_{178}$
	170	0	$21912660_1 = \chi_{178}, \varphi_{179}$
	171	0	$22347776_1 = \chi_{179}, \varphi_{180}$
	172	0	$22410675_1 = \chi_{180}, \varphi_{181}$
	173	0	$22410675_2 = \chi_{181}, \varphi_{182}$
	174	0	$22410675_3 = \chi_{182}, \varphi_{183}$
	175	0	$23477850_1 = \chi_{183}, \varphi_{184}$
	176	0	$23477850_2 = \chi_{184}, \varphi_{185}$
	177	0	$25970560_1 = \chi_{188}, \varphi_{186}$
	178	0	$25970560_2 = \chi_{189}, \varphi_{187}$
	179	0	$26295192_1 = \chi_{190}, \varphi_{188}$
	180	0	$26712576_1 = \chi_{191}, \varphi_{189}$
	181	0	$29002050_1 = \chi_{192}, \varphi_{190}$
	182	0	$29002050_2 = \chi_{193}, \varphi_{191}$
	183	0	$29216880_1 = \chi_{194}, \varphi_{192}$
	184	0	$29680640_1 = \chi_{195}, \varphi_{193}$
	185	0	$32868990_1 = \chi_{196}, \varphi_{194}$
	186	0	$37564560_1 = \chi_{198}, \varphi_{195}$

<b>Block 1:</b>	$\varphi_1$	$\varphi_3$	$\varphi_5$	$\varphi_{16}$	$\varphi_{21}$	$\varphi_{66}$	$\varphi_{76}$	$\varphi_{114}$	$\varphi_{161}$	$\varphi_{176}$
$1_1 = \chi_1$	1	.	.	.	.	.	.	.	.	.
$187_1 = \chi_3$	.	1	.	.	.	.	.	.	.	.
$495_1 = \chi_5$	1	.	1	.	.	.	.	.	.	.
$40392_1 = \chi_{16}$	.	1	.	1	.	.	.	.	.	.
$52360_1 = \chi_{22}$	.	.	1	.	1	.	.	.	.	.
$1292544_1 = \chi_{66}$	.	.	.	.	1	1	.	.	.	.
$1675520_1 = \chi_{76}$	.	.	.	1	.	.	1	.	.	.
$6127616_1 = \chi_{123}$	.	.	.	.	.	1	.	1	.	.
$16220160_1 = \chi_{165}$	.	.	.	.	.	.	1	.	1	.
$23856525_1 = \chi_{185}$	.	.	.	.	.	.	.	1	.	1
$23856525_2 = \chi_{186}$	.	.	.	.	.	.	.	1	.	1
$23856525_3 = \chi_{187}$	.	.	.	.	.	.	.	1	.	1
$33554432_1 = \chi_{197}$	.	.	.	.	.	.	.	.	1	1

$$\begin{aligned}
\varphi_1 &= 1_1 & \varphi_{66} &= 1240678_1 \\
\varphi_3 &= 187_1 & \varphi_{76} &= 1635315_1 \\
\varphi_5 &= 494_1 & \varphi_{114} &= 4886938_1 \\
\varphi_{16} &= 40205_1 & \varphi_{161} &= 14584845_1 \\
\varphi_{21} &= 51866_1 & \varphi_{176} &= 18969587_1
\end{aligned}$$