

Invariants of the Surface $\tilde{Z}_{14,1}$

Basic Numerical Invariants:

Geometric:	p_g	$h^{1,1}$	b_2	sgn	c_2	K^2
	4	50	58	-40	60	0

Other:	m	g	r_0	g_0	r_1	g_1	s_{11}	r_∞	g_∞	h	L_∞	L	$2S_\infty$	$2S$
	1008	49	8	23	6	15	3	9	1	20	19	36	2	2

The Singularities of the associated singular surface $Z_{14,1}$

The Singularities above P_0 :

No	Name	Sign	Deg	Orbit	Basis of M_P	Quadratic Form	Reduced Form
1	[0, 13]	+	1	1	[14, 13], [1, 1]	[365, 756, 392]	[1, 0, 196]
2	[2, 9]	+	2	2	[2, 9], [-1, -4]	[85, -1064, 3332]	[8, -4, 25]
3	[5, 12]	+	2	2	[5, 12], [2, 5]	[169, 1960, 5684]	[8, 4, 25]
4	[7, 8]	+	1	3	[7, 8], [-1, -1]	[113, -420, 392]	[4, 0, 49]
5	[2, 11]	-	4	4	[2, 11], [-1, -5]	[125, -1596, 5096]	[13, 10, 17]
6	[3, 12]	-	4	4	[3, 26], [1, 9]	[685, 6636, 16072]	[13, -10, 17]
7	[4, 9]	-	4	4	[4, 9], [-1, -2]	[97, -616, 980]	[5, 4, 40]
8	[5, 10]	-	4	4	[5, 24], [1, 5]	[601, 3500, 5096]	[5, -4, 40]

The CM-Singularities above P_1 (those of type (-3))

No	Name	Sign	Deg	Orbit	Basis of M_P	Quadratic Form	Reduced Form
9	[0, 1]	+	1	1	[0, 1], [-1, 0]	[1, -14, 196]	[1, 0, 147]
10	[1, 6]	+	2	2	[1, 6], [0, 1]	[43, 182, 196]	[4, -2, 37]
11	[1, 7]	+	2	2	[1, 7], [0, 1]	[57, 210, 196]	[4, 2, 37]

The anti-CM-Singularities above P_1 (those of type $(-2, -2)$)

No	Name	Sign	Deg	Orbit	Basis of M_P	Quadratic Form	Reduced Form
12	[1, 3]	-	3	3	[1, 3], [0, 1]	[13, 98, 196]	[12, 6, 13]
13	[3, 1]	-	3	3	[3, 1], [-1, 0]	[13, -98, 196]	[12, -6, 13]
14	[3, 3]	-	3	3	[3, 17], [1, 6]	[349, 3430, 8428]	[3, 0, 49]

The Singularities above P_∞ :

No	Name	Degree	Orbit	Type	Length	Continued Fraction Expansion
15	[1, 0]	1	1	[14, 1]	1	[14]
16	[1, 2]	3	2	[2, 1]	1	[2]
17	[1, 4]	3	2	[2, 1]	1	[2]
18	[1, 6]	3	2	[2, 1]	1	[2]
19	[1, 7]	1	3	[7, 1]	1	[7]
20	[2, 7]	1	4	[7, 2]	2	[4, 2]
21	[3, 0]	1	5	[14, 11]	5	[2, 2, 2, 3, 2]
22	[3, 7]	1	6	[7, 4]	2	[2, 4]
23	[5, 0]	1	7	[14, 9]	5	[2, 3, 2, 2, 2]

The Basic Curves on $\tilde{Z}_{14,1}$:

Table of the non-exceptional basic curves

No	p_a	g	δ_C	C^2
1	23	23	0	-4
10	23	23	0	-4
11	15	15	0	-3
21	15	15	0	-3
22	1	1	0	-4
42	1	1	0	-4

The intersection matrix for the non-exceptional curves:

No	1	10	11	21	22	42
1	-4	248	0	168	0	36
10	248	-4	168	0	36	0
11	0	168	-3	110	0	24
21	168	0	110	-3	24	0
22	0	36	0	24	-4	3
42	36	0	24	0	3	-4

The intersection matrix for the P_0 -curves (curves 1...10)

No	1	2	3	4	5	6	7	8	9	10
1	-4	1	1	1	1	1	1	1	1	248
2	1	-2	0	0	0	0	0	0	0	1
3	1	0	-2	0	0	0	0	0	0	1
4	1	0	0	-2	0	0	0	0	0	1
5	1	0	0	0	-2	0	0	0	0	1
6	1	0	0	0	0	-2	0	0	0	1
7	1	0	0	0	0	0	-2	0	0	1
8	1	0	0	0	0	0	0	-2	0	1
9	1	0	0	0	0	0	0	0	-2	1
10	248	1	1	1	1	1	1	1	1	-4

The intersection matrix for the P_1 -curves (curves 11...21)

No	11	12	13	14	15	16	17	18	19	20	21
11	-3	1	1	1	1	0	1	0	1	0	110
12	1	-3	0	0	0	0	0	0	0	0	1
13	1	0	-3	0	0	0	0	0	0	0	1
14	1	0	0	-3	0	0	0	0	0	0	1
15	1	0	0	0	-2	1	0	0	0	0	0
16	0	0	0	0	1	-2	0	0	0	0	1
17	1	0	0	0	0	0	-2	1	0	0	0
18	0	0	0	0	0	0	1	-2	0	0	1
19	1	0	0	0	0	0	0	0	-2	1	0
20	0	0	0	0	0	0	0	0	1	-2	1
21	110	1	1	1	0	1	0	1	0	1	-3

The intersection matrix for the P_∞ -curves (curves 22...42)

No	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
22	-4	1	1	1	1	1	1	0	1	0	0	0	0	1	0	1	0	0	0	0	3
23	1	-14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
24	1	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
25	1	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
26	1	0	0	0	-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
27	1	0	0	0	0	-7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
28	1	0	0	0	0	0	-4	1	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	1	-2	0	0	0	0	0	0	0	0	0	0	0	0	1
30	1	0	0	0	0	0	0	0	-2	1	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	1	-2	1	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	1	-2	1	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	1	-3	1	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	1	-2	0	0	0	0	0	0	0	0	1
35	1	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-4	0	0	0	0	0	1
37	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	1	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-3	1	0	0	0
39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-2	1	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-2	1	0
41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	-2	1
42	3	1	1	1	1	1	0	1	0	0	0	0	1	0	1	0	0	0	0	1	-4

The Hecke curves $T = T_{n,k}$ on $\tilde{Z}_{14,1}$ for $n \leq 30$

Their basic properties:

No	n	k	deg	p_a	g_T	δ	T^2
43	1	1	1	0	0	0	-1
44	9	5	12	0	0	0	-2
45	11	3	12	1	1	0	-2
46	15	1	24	1	1	0	-2
47	23	5	24	2	2	0	-2
48	25	3	30	0	0	0	-4
49	29	1	30	2	2	0	-2

Their intersection numbers with other curves:

a) Those with the curves over P_0 :

No	n	k	deg	1	2	3	4	5	6	7	8	9	10
43	1	1	1	0	1	0	0	0	0	0	0	0	0
44	9	5	12	6	0	0	0	0	0	0	0	0	6
45	11	3	12	6	0	0	0	0	0	0	0	0	6
46	15	1	24	12	0	0	0	0	0	0	0	0	12
47	23	5	24	12	0	0	0	0	0	0	0	0	12
48	25	3	30	14	0	1	1	0	0	0	0	0	14
49	29	1	30	14	0	1	1	0	0	0	0	0	14

b) Those with the curves over P_1 :

No	n	k	deg	11	12	13	14	15	16	17	18	19	20	21
43	1	1	1	0	1	0	0	0	0	0	0	0	0	0
44	9	5	12	4	0	0	0	0	0	0	0	0	0	4
45	11	3	12	4	0	0	0	0	0	0	0	0	0	4
46	15	1	24	8	0	0	0	0	0	0	0	0	0	8
47	23	5	24	8	0	0	0	0	0	0	0	0	0	8
48	25	3	30	10	0	0	0	0	0	0	0	0	0	10
49	29	1	30	10	0	0	0	0	0	0	0	0	0	10

c) Those with the curves over P_∞ :

No	n	k	deg	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
43	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	9	5	12	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
45	11	3	12	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
46	15	1	24	1	2	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
47	23	5	24	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0
48	25	3	30	1	4	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
49	29	1	30	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

d) Those of the Hecke curves with each other:

No	n	k	deg	43	44	45	46	47	48	49
43	1	1	1	-1	0	0	0	0	0	0
44	9	5	12	0	-2	0	0	0	0	0
45	11	3	12	0	0	-2	0	0	0	0
46	15	1	24	0	0	0	-2	0	0	2
47	23	5	24	0	0	0	0	-2	2	2
48	25	3	30	0	0	0	0	2	-4	0
49	29	1	30	0	0	0	2	2	0	-2