$p = 5$

k	d_k^+	d_k^-
2	0	0
4	1	0
6	0	1
8	2	1
10	1	2
12	3	2
14	2	3
16	4	3
18	3	4
20	5	4
22	4	5
24	6	5
26	5	6

$p = 23$

k	d_k^+	d_k^-
2	0	2
4	4	1
6	3	6
8	8	5
10	7	10
12	12	9
14	11	14
16	16	13
18	15	18
20	20	17
22	19	22
24	24	21
26	23	26

$p = 101$

k	d_k^+	d_k^-
2	1	7
4	16	9
6	17	24
8	33	26
10	34	41
12	50	43
14	51	58
16	67	60
18	68	75
20	84	77
22	85	92
24	101	94
26	102	109

$$d_k^{\pm} = \dim S_k(p)^{\pm}$$

$p = 5$

k	d_k^+	d_k^-
2	0	0
4	1	0
6	0	1
8	2	1
10	1	2
12	3	2
14	2	3
16	4	3
18	3	4
20	5	4
22	4	5
24	6	5
26	5	6

$\Delta_k = \pm 1$

$p = 23$

k	d_k^+	d_k^-
2	0	2
4	4	1
6	3	6
8	8	5
10	7	10
12	12	9
14	11	14
16	16	13
18	15	18
20	20	17
22	19	22
24	24	21
26	23	26

$\Delta_k = \pm 3$

$p = 101$

k	d_k^+	d_k^-
2	1	7
4	16	9
6	17	24
8	33	26
10	34	41
12	50	43
14	51	58
16	67	60
18	68	75
20	84	77
22	85	92
24	101	94
26	102	109

$\Delta_k = \pm 7$

$d_k^{\pm} = \dim S_k(p)^{\pm}$ $\qquad$ $\Delta_k = d_k^+ - d_k^-$

$p = 5, N = 23$

Table of dimension splits with $(d^+_{k,g},\ d^-_{k,g})$ in the k-g entry.

$k\backslash g$	f	$f[1]$	$f[2]$	$f[3]$
2	$(3,2)$	—	$(0,0)$	—
4	—	$(2,3)$	—	$(0,0)$
6	$(5,5)$	—	$(3,2)$	—
8	—	$(5,5)$	—	$(2,3)$
10	$(8,7)$	—	$(5,5)$	—
12	—	$(7,8)$	—	$(5,5)$
14	$(10,10)$	—	$(8,7)$	—
16	—	$(10,10)$	—	$(7,8)$
18	$(13,12)$	—	$(10,10)$	—
20	—	$(12,13)$	—	$(10,10)$
22	$(15,15)$	—	$(13,12)$	—
24	—	$(15,15)$	—	$(12,13)$

Here $f = q + 2q^2 + 2q^4 + 4q^5 + q^7 + \cdots$ in $S_2(23, \mathbb{F}_5)$.

$p = 5, N = 23$

Table of dimension splits with $(d^+_{k,g},\ d^-_{k,g})$ in the k-g entry.

$k \backslash g$	f	$f[1]$	$f[2]$	$f[3]$
2	$(3,2)$	—	$(0,0)$	—
4	—	$(2,3)$	—	$(0,0)$
6	$(5,5)$	—	$(3,2)$	—
8	—	$(5,5)$	—	$(2,3)$
10	$(8,7)$	—	$(5,5)$	—
12	—	$(7,8)$	—	$(5,5)$
14	$(10,10)$	—	$(8,7)$	—
16	—	$(10,10)$	—	$(7,8)$
18	$(13,12)$	—	$(10,10)$	—
20	—	$(12,13)$	—	$(10,10)$
22	$(15,15)$	—	$(13,12)$	—
24	—	$(15,15)$	—	$(12,13)$

Here $f = q + 2q^2 + 2q^4 + 4q^5 + q^7 + \cdots$ in $S_2(23, \mathbb{F}_5)$.

$p = 5,\ N = 23$ All 7 Galois orbits of eigensystems; the k-f entry is $\left(d^{+}_{k,\tau[\frac{k-2}{2}]},\ d^{-}_{k,\tau[\frac{k-2}{2}]}\right)$.

$k \backslash \tau$	e	$e[2]$	σ	$\sigma[2]$	t	$t[2]$	s	$s[2]$	$f,\ f[2]$ $g,\ g[2]$ $h,\ h[2]$	Total
2	(0,0)	(0,0)	(3,2)	(0,0)	(2,0)	(0,0)	(0,1)	(0,0)	(0,0)	(5,6)
4	(2,1)	(0,0)	(2,3)	(0,0)	(0,2)	(0,0)	(1,0)	(0,0)	(1,1)	(18,16)
6	(1,2)	(1,1)	(3,2)	(5,5)	(2,0)	(2,2)	(0,1)	(1,1)	(1,1)	(28,30)
8	(2,1)	(3,3)	(2,3)	(5,5)	(0,2)	(2,2)	(1,0)	(1,1)	(2,2)	(42,40)
10	(2,3)	(3,3)	(8,7)	(5,5)	(4,2)	(2,2)	(1,2)	(1,1)	(2,2)	(52,54)
12	(5,4)	(3,3)	(7,8)	(5,5)	(2,4)	(2,2)	(2,1)	(1,1)	(3,3)	(66,64)
14	(4,5)	(4,4)	(8,7)	(10,10)	(4,2)	(4,4)	(1,2)	(2,2)	(3,3)	(76,78)
16	(5,4)	(6,6)	(7,8)	(10,10)	(2,4)	(4,4)	(2,1)	(2,2)	(4,4)	(90,88)
18	(5,6)	(6,6)	(13,12)	(10,10)	(6,4)	(4,4)	(2,3)	(2,2)	(4,4)	(100,102)
20	(8,7)	(6,6)	(12,13)	(10,10)	(4,6)	(4,4)	(3,2)	(2,2)	(5,5)	(114,112)

- e is the Eisenstein eigensystem in weight 2: $e(\ell) = 1 + \ell$
- s is a $\mathbb{F}_{5^4}$-Galois orbit of 4 eigensystems; h is an $\mathbb{F}_{5^3}$-orbit of 3 eigensystems
- σ: Serre weight 2 (peu ramifié); t and s: Serre weight 6 (très ramifié); f, g, h: Serre weight 4