

$$N = 142 = 2 \cdot 71$$

By the Ibukiyama-Kitayama dimension formula,
 $\dim(S_4(K(142))) = 57$

By the Skoruppa-Zagier dimension formula and Jacobi restriction,
the lift dimension of $S_4(K(142))^+$ is 25
the nonlift dimension of $S_4(K(142))^+$ is heuristically 27
 $\dim(S_4(K(142))^+)$ thus is heuristically 52
 $\dim(S_4(K(142))^-)$ is heuristically 5

The heuristic dimensions are correct by the spanning results to follow

$\dim(J_{\{2,142\}}^{\{\text{cusp}\}}) = 2$ (Skoruppa-Zagier), so need to span to within 1 dimension

$q = 5$ for TraceDown

After TD($\text{Grit}(J_{\{4,710\}}^{\{\text{cusp}\}})$) and $(\text{Grit}(J_{\{2,142\}}^{\{\text{cusp}\}}))^2$,
spanned rank in $S_4(K(142))^+$ is 52
spanned rank in $S_4(K(142))^-$ is 0

Hecke operators applied: $\{\{2, 2\}\}, \{\{2, 2\}, \{2, 1\}\}, \{\{2, 2\}, \{3, 1\}\}$

After Hecke spreading,
spanned rank in $S_4(K(142))^-$ is 4

After Borcherds products,
spanned rank in $S_4(K(142))^-$ is 5

Final spanned rank in $S_4(K(142))^+$ is 52

Final spanned rank in $S_4(K(142))^-$ is 5

$S_2(K(142))$ is determined by Jacobi restriction and the $H4Ndd(2,+)$ test
($H_4(142,2,2)^+ = 0$)

So $S_2(K(142)) = \text{Grit}(J_{\{2,142\}}^{\{\text{cusp}\}})$ (dimension 2)