

$$N = 130 = 2 \cdot 5 \cdot 13$$

By the Ibukiyama-Kitayama dimension formula,
 $\dim(S_4(K(130))) = 46$

By the Skoruppa-Zagier dimension formula and Jacobi restriction,
the lift dimension of $S_4(K(130))^+$ is 21
the nonlift dimension of $S_4(K(130))^+$ is heuristically 22
 $\dim(S_4(K(130))^+)$ thus is heuristically 43
 $\dim(S_4(K(130))^-)$ is heuristically 3

The heuristic dimensions are correct by the spanning results to follow

$\dim(J_{\{2,130\}}^{\{\text{cusp}\}}) = 2$ (Skoruppa-Zagier), so need to span to within 1 dimension

$q = 7$ for TraceDown

After TD($\text{Grit}(J_{\{4,910\}}^{\{\text{cusp}\}})$) and $(\text{Grit}(J_{\{2,130\}}^{\{\text{cusp}\}}))^2$,
spanned rank in $S_4(K(130))^+$ is 43
spanned rank in $S_4(K(130))^-$ is 0

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

After Hecke spreading,
spanned rank in $S_4(K(130))^-$ is 3

Final spanned rank in $S_4(K(130))^+$ is 43

Final spanned rank in $S_4(K(130))^-$ is 3

$S_2(K(130))$ is determined by Jacobi restriction and the $H4Ndd(2,+)$ test
 $(H_4(130,2,2))^+ = 0$

So $S_2(K(130)) = \text{Grit}(J_{\{2,130\}}^{\{\text{cusp}\}})$ (dimension 2)