

$$N = 187 = 11 \cdot 17$$

By the Ibukiyama-Kitayama dimension formula,
 $\dim(S_4(K(187))) = 80$

By the Skoruppa-Zagier dimension formula and Jacobi restriction,
the lift dimension of $S_4(K(187))^+$ is 35
the nonlift dimension of $S_4(K(187))^+$ is heuristically 39
 $\dim(S_4(K(187))^+)$ thus is heuristically 74
 $\dim(S_4(K(187))^-)$ is heuristically 6

The heuristic dimensions are correct by the spanning results to follow

$\dim(J_{\{2,187\}}^{\{\text{cusp}\}}) = 5$ (Skoruppa-Zagier), so need to span to within 4 dimensions

$q = 3$ for TraceDown

After TD($\text{Grit}(J_{\{4,561\}}^{\{\text{cusp}\}})$) and $(\text{Grit}(J_{\{2,187\}}^{\{\text{cusp}\}}))^2$,
spanned rank in $S_4(K(187))^+$ is 74
spanned rank in $S_4(K(187))^-$ is 0

After Borcherds products,
spanned rank in $S_4(K(187))^-$ is 6

Final spanned rank in $S_4(K(187))^+$ is 74

Final spanned rank in $S_4(K(187))^-$ is 6

$S_2(K(187))$ is determined by Jacobi restriction and the $H4Ndd(2,+)$ test
($H_4(187,2,2)^+ = 0$)

So $S_2(K(187)) = \text{Grit}(J_{\{2,187\}}^{\{\text{cusp}\}})$ (dimension 5)