

Heuristic tables of nonlift weight two paramodular cuspidal newforms to level 1000

Cris Poor
Fordham University

David S. Yuen
University of Hawaii

last updated: May 6, 2018

Heuristic Tables for the Paramodular Conjecture

(found by classifying initial Fourier-Jacobi expansions)

With updated dimensions from: *Nonlift weight two paramodular eigenform constructions*, by Poor, Shurman, and Yuen. In progress.

And from: *Antisymmetric paramodular forms of weights 2 and 3*, by Gritsenko, Poor, and Yuen: arXiv:1609.04146v1.

Heuristic tables: $k = 2$ paramodular newforms.

$$+\text{new nonlift} = \dim \left((S_2(K(N))^{\text{new}})^+ / \text{Grit} \left(J_{2,N}^{\text{cusp}} \right) \right)$$

$$-\text{new} = \dim (S_2(K(N))^{\text{new}})^- .$$

The “=” means “proven.”

N	+new	-new	various comments
249	= 1		BP+Grit; Jac
277	= 1		modular! Q/L; Jac
295	= 1		BP+Grit; Jac
349	= 1		BP+Grit; Jac
353	= 1		modular! BP+Grit; Jac
388	1		Jac

N	+new	-new	various comments
389	= 1		BP+Grit; Jac
394	1		Jac
427	1		Jac
461	= 1		Tr(BP)+Grit; Jac
464	1		Jac
472	1		Jac
511	2		quad pair, $\mathbb{Q}(\sqrt{5})$; 4-dim A/\mathbb{Q} ?
523	= 1		BP+Grit; Jac
550	1		no match known

N	+new	-new	various comments
555	1		Jac
561	1		Prym
574	1		Jac
587	= 1	= 1 <i>modular!</i>	Tr(BP)+Grit and BP-; Jacs
597	1		Jac
603	1		Jac
604	1		Jac
623	1		Jac
633	1		Jac

N	+new	-new	various comments
637	2		quad pair, $\mathbb{Q}(\sqrt{2})$; 4-dim A/\mathbb{Q} ?
644	1		Jac
645	2		quad pair, $\mathbb{Q}(\sqrt{2})$; 4-dim A/\mathbb{Q} ?
657	≥ 1		modular! WR: $E_{(9\zeta_6-8)}/\mathbb{Q}(\sqrt{-3})$
665	1		Prym
688	1		Jac
691	1		Jac
702	1		no match known

$$\zeta_6 = \exp(2\pi i \frac{1}{6})$$

N	+new	-new	various comments
704	1		Jac
708	1		Jac
709	1		Jac
713	1	≥ 1	BP-; Jacs
731	$= 1$		Berger and Klosin: modular! Jac
737	1		Prym
741	1		Jac
743		1	Jac

N	+new	-new	various comments
745	1		Jac
760	1		no match known
762	1		Jac
763	1		Jac
768	1		Jac
775	≥ 1		modular! WR: $E_{(5\phi-2)}/\mathbb{Q}(\sqrt{5})$
797	1		Jac

$$\phi = \frac{1 + \sqrt{5}}{2}$$

N	+new	-new	various comments
807	1		Jac
816	1		Jac
826	1		Jac
830	1		Jac
832	1		Jac
834	1		Jac
847	1		Jac
856	1		Jac

N	+new	-new	various comments
862	2		Jac
875	2		quad pair $\mathbb{Q}(\sqrt{5})$
886	1		Jac
891	2		quad pair $\mathbb{Q}(\sqrt{3})$
893	1	≥ 1	BP, Jacs
901	1		Jac
903	1		match unknown
909	1		Jac

N	+new	-new	various comments
924	1		match unknown
925	1		Jac
927	2		quad pair $\mathbb{Q}(\sqrt{2})$
931	2		quad pair $\mathbb{Q}(\sqrt{5})$
932		1	Jac
945	1		match unknown
953		≥ 1	BP, Jac
954	2		Twists by $\sqrt{-3}$, Jacs

N	+new	-new	various comments
966	1		Jac
969	1		match unknown
970	2		Jacs
971		≥ 1	BP, Jac
975	1		Jac
976	1		Jac
988	1		match unknown
991	3		cubic triple $\mathbb{Q}(x)$, $x^3 - x^2 - 3x + 1 = 0$
997	1	≥ 1	BP, Jacs

Thanks to Armand Brumer for all his help, in particular for providing the majority of the corresponding abelian surfaces in this table.