CLASSIFICATION OF PARABOLIC CURVATURE OPERATORS OF HIGH ORDER

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This table lists all of the curvature components of parabolic geometries of type (G, P) for which (1) G is simple and (2) the curvature operator in the deformation complex has order ≥ 3.

order	geometry	word	nonrigid	nonrigid $P' < P$	twistorial	notes
8	G_2/P_{12}	(12)	•		G_2/P_1	
6	B_3/P_{23}	(32)	•		B_3/P_3	
	C_n/P_{12}	(21)	•	P_{12m}, $3 \leq m \leq n$, $n \geq 3$		$n \geq 2$; C_2, C_3 exceptional
	G_2/P_1	(12)	•			
4	A_n/P_{12}	(21)	•	P_{12n}, $n \geq 3$; $P_{12\ell m}$, $3 \leq \ell < m \leq n$, $n \geq 4$		$n \geq 2$; A_2, A_3 exceptional
	B_3/P_3	(32)	•	P_{13}		
	B_n/P_{12}	(12)	•			$n \geq 3$; B_3 exceptional
	B_n/P_{23}	(32)	•		B_n/P_3	$n \geq 4$; B_4 exceptional
	D_n/P_{12}	(12)	•	P_{12n}		$n \geq 4$; D_4 exceptional
	D_n/P_{23}	(32)	•		D_n/P_3	$n \geq 5$; D_5 exceptional
	E_n/P_{24}	(42)				$n = 6, 7, 8$
	F_4/P_{12}	(21)				
3	$B_n/P_{n-1,n}$	$(n, n-1)$				$n \geq 4$
	$C_n/P_{n-1,n}$	$(n-1, n)$	•		C_n/P_{n-1}	$n \geq 3$
	C_n/P_2	(21)	•	P_{2n}, $n \geq 3$		$n \geq 2$
	$C_n/P_{1\ell}$	$(\ell 1)$				$n \geq 3$, $3 \leq l \leq n$; $P_{1,n-1}, P_{1n}$ exceptional
	F_4/P_{23}	(32)				

Some notes are in order:

(1) A curvature component is called nonrigid if normality does not force its vanishing. (NB in the lone case of $C_n/P_{1\ell}$ the above curvature component is not nonrigid but normality does not force some other curvature components of that geometry to vanish.)

(2) For any parabolic geometry of type (G, P), word w corresponding to a component of curvature, and parabolic subgroup $P' < P$, the order of the operator corresponding to the word w for type (G, P') is at least that of the operator corresponding to w for (G, P').

(3) For components that are nonrigid, the column "nonrigid $P' < P$ lists the proper parabolic subgroups of the parabolic subgroup specified under "geometry". These lists omit those accounted for elsewhere (in fact, always earlier) in the table, so that each curvature component of a nonrigid geometry whose corresponding operator has order ≥ 3 appears exactly once in the table.

(4) For a type (G, P) of parabolic geometry that (in the normal, regular setting) always arises via a twistorial construction from a geometry of type (G, P') for a parabolic subgroup $P' > P$, the column "twistorial" indicates the latter type.

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