

PREHOMOGENEOUS SPACES ASSOCIATED WITH NILPOTENT ORBITS IN TYPE EII

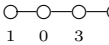
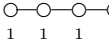
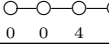
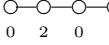
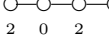
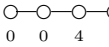
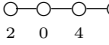
STEVEN GLENN JACKSON AND ALFRED G. NOËL

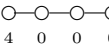
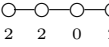
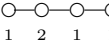
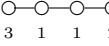
Nilpotent orbits in type EII				
Orbit	$K_{\mathbb{C}}$ diagram	i	$\dim \mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$	Highest weights of $\mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$
1.	$\begin{array}{ccccccccc} \circ & - & \circ & - & \circ & - & \circ & - & \circ & - & \circ \\ 0 & 0 & 1 & 0 & 0 & 1 & & & & & \end{array}$	1	10	$(1, 0, 0, 0, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
2.	$\begin{array}{ccccccccc} \circ & - & \circ & - & \circ & - & \circ & - & \circ & - & \circ \\ 1 & 0 & 0 & 0 & 1 & 2 & & & & & \end{array}$	1	8	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		2	2	$(1, 0, 0, 0, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
3.	$\begin{array}{ccccccccc} \circ & - & \circ & - & \circ & - & \circ & - & \circ & - & \circ \\ 0 & 1 & 0 & 1 & 0 & 0 & & & & & \end{array}$	1	8	$(1, 0, 1, -1, 0, 0)$ $(0, -1, 1, 0, 1, 0)$
		2	4	$(1, 0, 0, 0, 1, 0)$
4.	$\begin{array}{ccccccccc} \circ & - & \circ & - & \circ & - & \circ & - & \circ & - & \circ \\ 0 & 0 & 1 & 0 & 0 & 3 & & & & & \end{array}$	1	9	$(1, 0, 0, 0, 1, 0)$
		3	1	$(0, 0, 0, 0, 0, 2)$
5.	$\begin{array}{ccccccccc} \circ & - & \circ & - & \circ & - & \circ & - & \circ & - & \circ \\ 1 & 0 & 1 & 0 & 1 & 1 & & & & & \end{array}$	1	9	$(1, 1, -1, 0, 0, 0)$ $(0, 0, -1, 1, 1, 0)$ $(-1, 1, 0, 1, -1, 0)$ $(0, 0, 0, 0, 0, 2)$
		2	4	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		3	1	$(1, 0, 0, 0, 1, 0)$
6.	$\begin{array}{ccccccccc} \circ & - & \circ & - & \circ & - & \circ & - & \circ & - & \circ \\ 0 & 0 & 0 & 0 & 0 & 4 & & & & & \end{array}$	4	1	$(0, 0, 0, 0, 0, 2)$
7.	$\begin{array}{ccccccccc} \circ & - & \circ & - & \circ & - & \circ & - & \circ & - & \circ \\ 2 & 0 & 0 & 0 & 2 & 0 & & & & & \end{array}$	2	8	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		4	1	$(1, 0, 0, 0, 1, 0)$
8.	$\begin{array}{ccccccccc} \circ & - & \circ & - & \circ & - & \circ & - & \circ & - & \circ \\ 0 & 0 & 2 & 0 & 0 & 2 & & & & & \end{array}$	2	10	$(1, 0, 0, 0, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
9.	$\begin{array}{ccccccccc} \circ & - & \circ & - & \circ & - & \circ & - & \circ & - & \circ \\ 2 & 1 & 0 & 0 & 1 & 1 & & & & & \end{array}$	1	7	$(-1, 1, 0, 1, -1, 0)$ $(0, -1, 1, 0, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
		2	2	$(2, -1, 0, 0, 0, 0)$ $(-1, 1, 0, 0, 1, 0)$
		3	3	$(1, 0, 0, 1, -1, 0)$
		4	1	$(1, 0, 0, 0, 1, 0)$
10.	$\begin{array}{ccccccccc} \circ & - & \circ & - & \circ & - & \circ & - & \circ & - & \circ \\ 1 & 0 & 0 & 1 & 2 & 1 & & & & & \end{array}$	1	7	$(1, 0, 1, -1, 0, 0)$ $(-1, 1, 0, 1, -1, 0)$ $(0, 0, 0, 0, 0, 2)$
<i>(continued on next page)</i>				

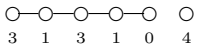
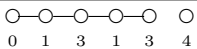
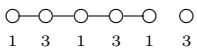
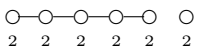
2000 *Mathematics Subject Classification.* 17B05;17B10;17B20;22E30.

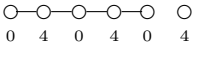
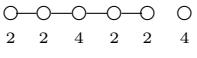
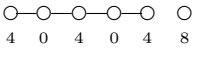
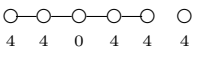
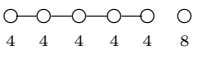
Key words and phrases. Lie group, nilpotent orbit, prehomogeneous space.

Nilpotent orbits in type EII (continued)				
Orbit	$K_{\mathbb{C}}$ diagram	i	$\dim \mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$	Highest weights of $\mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$
		2	2	$(0, 0, 0, -1, 2, 0)$ $(1, 0, 0, 1, -1, 0)$
		3	3	$(-1, 1, 0, 0, 1, 0)$
		4	1	$(1, 0, 0, 0, 1, 0)$
11.		2	8	$(1, 0, 1, -1, 0, 0)$ $(0, -1, 1, 0, 1, 0)$
		4	4	$(1, 0, 0, 0, 1, 0)$
12.		1	6	$(-1, 1, 0, 0, 1, 0)$
		3	2	$(1, 1, -1, 0, 0, 0)$
		4	3	$(1, 0, 0, 0, 1, 0)$
13.		1	6	$(1, 0, 0, 1, -1, 0)$
		3	2	$(0, 0, -1, 1, 1, 0)$
		4	3	$(1, 0, 0, 0, 1, 0)$
14.		1	6	$(2, -1, 0, 0, 0, 0)$ $(0, 0, 0, -1, 2, 0)$ $(-1, 1, 1, -1, 0, 0)$ $(0, -1, 1, 1, -1, 0)$
		2	6	$(1, 0, 1, -1, 0, 0)$ $(-1, 1, 0, 1, -1, 0)$ $(0, -1, 1, 0, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
		3	2	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		4	1	$(1, 0, 0, 0, 1, 0)$
15.		1	4	$(1, 1, -1, 0, 0, 0)$ $(0, 0, -1, 1, 1, 0)$
		2	4	$(-1, 1, 0, 1, -1, 0)$
		3	4	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		4	2	$(1, 0, 0, 0, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
16.		1	4	$(1, 1, -1, 0, 0, 0)$ $(0, 0, -1, 1, 1, 0)$
		2	2	$(0, -1, 2, -1, 0, 0)$ $(0, 0, 0, 0, 0, 2)$
		3	4	$(1, 0, 1, -1, 0, 0)$ $(0, -1, 1, 0, 1, 0)$
		4	4	$(1, 0, 0, 0, 1, 0)$
17.		1	6	$(2, -1, 0, 0, 0, 0)$ $(-1, 2, -1, 0, 0, 0)$ $(0, -1, 2, -1, 0, 0)$ $(0, 0, -1, 2, -1, 0)$ $(0, 0, 0, -1, 2, 0)$ $(0, 0, 0, 0, 0, 2)$
		2	4	$(1, 1, -1, 0, 0, 0)$ $(-1, 1, 1, -1, 0, 0)$ $(0, -1, 1, 1, -1, 0)$ $(0, 0, -1, 1, 1, 0)$
(continued on next page)				

Nilpotent orbits in type EII (continued)				
Orbit	$K_{\mathbb{C}}$ diagram	i	$\dim \mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$	Highest weights of $\mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$ $(1, 0, 1, -1, 0, 0)$ $(-1, 1, 0, 1, -1, 0)$ $(0, -1, 1, 0, 1, 0)$
		3	3	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		4	2	$(1, 0, 0, 0, 1, 0)$
		5	1	
18.		1	5	$(1, 1, -1, 0, 0, 0)$ $(0, 0, -1, 1, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
		3	4	$(-1, 1, 0, 1, -1, 0)$
		4	4	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		5	1	$(1, 0, 0, 0, 1, 0)$
19.		1	5	$(2, -1, 0, 0, 0, 0)$ $(-1, 2, -1, 0, 0, 0)$ $(0, -1, 2, -1, 0, 0)$ $(0, 0, -1, 2, -1, 0)$ $(0, 0, 0, -1, 2, 0)$
		2	4	$(1, 1, -1, 0, 0, 0)$ $(-1, 1, 1, -1, 0, 0)$ $(0, -1, 1, 1, -1, 0)$ $(0, 0, -1, 1, 1, 0)$
		3	4	$(1, 0, 1, -1, 0, 0)$ $(-1, 1, 0, 1, -1, 0)$ $(0, -1, 1, 0, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
		4	2	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		5	1	$(1, 0, 0, 0, 1, 0)$
20.		4	9	$(1, 0, 0, 0, 1, 0)$
21.		2	8	$(1, 0, 1, -1, 0, 0)$ $(0, -1, 1, 0, 1, 0)$
		4	5	$(1, 0, 0, 0, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
22.		2	9	$(1, 1, -1, 0, 0, 0)$ $(0, 0, -1, 1, 1, 0)$ $(-1, 1, 0, 1, -1, 0)$ $(0, 0, 0, 0, 0, 2)$
		4	4	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		6	1	$(1, 0, 0, 0, 1, 0)$
23.		4	9	$(1, 0, 0, 0, 1, 0)$
		8	1	$(0, 0, 0, 0, 0, 2)$
24.		2	4	$(1, 1, -1, 0, 0, 0)$ $(0, 0, -1, 1, 1, 0)$
		4	5	$(-1, 1, 0, 1, -1, 0)$ $(0, 0, 0, 0, 0, 2)$
(continued on next page)				

Nilpotent orbits in type EII (continued)				
Orbit	$K_{\mathbb{C}}$ diagram	i	$\dim \mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$	Highest weights of $\mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$
		6	4	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
25.		8	1	$(1, 0, 0, 0, 1, 0)$
		4	9	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
		8	1	$(1, 0, 0, 0, 1, 0)$
26.		2	6	$(2, -1, 0, 0, 0, 0)$ $(0, 0, 0, -1, 2, 0)$ $(-1, 1, 1, -1, 0, 0)$ $(0, -1, 1, 1, -1, 0)$
		4	5	$(1, 0, 1, -1, 0, 0)$ $(-1, 1, 0, 1, -1, 0)$ $(0, -1, 1, 0, 1, 0)$
		6	2	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		8	1	$(1, 0, 0, 0, 1, 0)$
27.		1	4	$(2, -1, 0, 0, 0, 0)$ $(0, -1, 2, -1, 0, 0)$ $(0, 0, -1, 2, -1, 0)$ $(0, 0, 0, 0, 0, 2)$
		2	2	$(-1, 2, -1, 0, 0, 0)$ $(0, -1, 1, 1, -1, 0)$
		3	3	$(0, 0, 0, -1, 2, 0)$ $(1, 1, -1, 0, 0, 0)$ $(-1, 1, 1, -1, 0, 0)$
		4	3	$(0, 0, -1, 1, 1, 0)$ $(1, 0, 1, -1, 0, 0)$ $(-1, 1, 0, 1, -1, 0)$
		5	2	$(0, -1, 1, 0, 1, 0)$ $(1, 0, 0, 1, -1, 0)$
		7	1	$(-1, 1, 0, 0, 1, 0)$
		8	1	$(1, 0, 0, 0, 1, 0)$
28.		1	4	$(-1, 2, -1, 0, 0, 0)$ $(0, -1, 2, -1, 0, 0)$ $(0, 0, 0, -1, 2, 0)$ $(0, 0, 0, 0, 0, 2)$
		2	2	$(0, 0, -1, 2, -1, 0)$ $(-1, 1, 1, -1, 0, 0)$
		3	3	$(2, -1, 0, 0, 0, 0)$ $(0, -1, 1, 1, -1, 0)$ $(0, 0, -1, 1, 1, 0)$
		4	3	$(1, 1, -1, 0, 0, 0)$ $(-1, 1, 0, 1, -1, 0)$ $(0, -1, 1, 0, 1, 0)$
		5	2	$(1, 0, 1, -1, 0, 0)$ $(-1, 1, 0, 0, 1, 0)$
		7	1	$(1, 0, 0, 1, -1, 0)$
		8	1	$(1, 0, 0, 0, 1, 0)$
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Nilpotent orbits in type EII (continued)				
Orbit	$K_{\mathbb{C}}$ diagram	i	$\dim \mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$	Highest weights of $\mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$
29.		1	3	$(-1, 2, -1, 0, 0, 0)$ $(0, 0, -1, 1, 1, 0)$
		3	2	$(2, -1, 0, 0, 0, 0)$ $(0, -1, 2, -1, 0, 0)$
		4	5	$(1, 1, -1, 0, 0, 0)$ $(-1, 1, 1, -1, 0, 0)$ $(0, -1, 1, 0, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
		5	2	$(-1, 1, 0, 0, 1, 0)$
		7	1	$(1, 0, 1, -1, 0, 0)$
		8	2	$(1, 0, 0, 0, 1, 0)$
30.		1	3	$(0, 0, -1, 2, -1, 0)$ $(1, 1, -1, 0, 0, 0)$
		3	2	$(0, -1, 2, -1, 0, 0)$ $(0, 0, 0, -1, 2, 0)$
		4	5	$(0, -1, 1, 1, -1, 0)$ $(0, 0, -1, 1, 1, 0)$ $(1, 0, 1, -1, 0, 0)$ $(0, 0, 0, 0, 0, 2)$
		5	2	$(1, 0, 0, 1, -1, 0)$
		7	1	$(0, -1, 1, 0, 1, 0)$
		8	2	$(1, 0, 0, 0, 1, 0)$
31.		1	3	$(2, -1, 0, 0, 0, 0)$ $(0, -1, 2, -1, 0, 0)$ $(0, 0, 0, -1, 2, 0)$
		3	3	$(-1, 2, -1, 0, 0, 0)$ $(0, 0, -1, 2, -1, 0)$ $(0, 0, 0, 0, 0, 2)$
		4	4	$(1, 1, -1, 0, 0, 0)$ $(-1, 1, 1, -1, 0, 0)$ $(0, -1, 1, 1, -1, 0)$ $(0, 0, -1, 1, 1, 0)$
		5	2	$(1, 0, 1, -1, 0, 0)$ $(0, -1, 1, 0, 1, 0)$
		7	1	$(-1, 1, 0, 1, -1, 0)$
		8	2	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		9	1	$(1, 0, 0, 0, 1, 0)$
32.		2	6	$(2, -1, 0, 0, 0, 0)$ $(-1, 2, -1, 0, 0, 0)$ $(0, -1, 2, -1, 0, 0)$ $(0, 0, -1, 2, -1, 0)$ $(0, 0, 0, -1, 2, 0)$ $(0, 0, 0, 0, 0, 2)$
		4	4	$(1, 1, -1, 0, 0, 0)$ $(-1, 1, 1, -1, 0, 0)$ $(0, -1, 1, 1, -1, 0)$ $(0, 0, -1, 1, 1, 0)$
(continued on next page)				

Nilpotent orbits in type EII (continued)				
Orbit	$K_{\mathbb{C}}$ diagram	i	$\dim \mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$	Highest weights of $\mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$
		6	3	$(1, 0, 1, -1, 0, 0)$ $(-1, 1, 0, 1, -1, 0)$ $(0, -1, 1, 0, 1, 0)$
		8	2	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		10	1	$(1, 0, 0, 0, 1, 0)$
33.		4	9	$(1, 0, 1, -1, 0, 0)$ $(0, -1, 1, 0, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
		8	4	$(1, 0, 0, 0, 1, 0)$
34.		2	4	$(2, -1, 0, 0, 0, 0)$ $(-1, 2, -1, 0, 0, 0)$ $(0, 0, -1, 2, -1, 0)$ $(0, 0, 0, -1, 2, 0)$
		4	4	$(0, -1, 2, -1, 0, 0)$ $(1, 1, -1, 0, 0, 0)$ $(0, 0, -1, 1, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
		6	2	$(-1, 1, 1, -1, 0, 0)$ $(0, -1, 1, 1, -1, 0)$
		8	3	$(1, 0, 1, -1, 0, 0)$ $(-1, 1, 0, 1, -1, 0)$ $(0, -1, 1, 0, 1, 0)$
		10	2	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		12	1	$(1, 0, 0, 0, 1, 0)$
35.		4	8	$(1, 1, -1, 0, 0, 0)$ $(0, 0, -1, 1, 1, 0)$ $(-1, 1, 0, 1, -1, 0)$
		8	5	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
		12	1	$(1, 0, 0, 0, 1, 0)$
36.		4	7	$(2, -1, 0, 0, 0, 0)$ $(0, 0, 0, -1, 2, 0)$ $(-1, 1, 1, -1, 0, 0)$ $(0, -1, 1, 1, -1, 0)$ $(0, 0, 0, 0, 0, 2)$
		8	5	$(1, 0, 1, -1, 0, 0)$ $(-1, 1, 0, 1, -1, 0)$ $(0, -1, 1, 0, 1, 0)$
		12	2	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		16	1	$(1, 0, 0, 0, 1, 0)$
37.		4	5	$(2, -1, 0, 0, 0, 0)$ $(-1, 2, -1, 0, 0, 0)$ $(0, -1, 2, -1, 0, 0)$ $(0, 0, -1, 2, -1, 0)$ $(0, 0, 0, -1, 2, 0)$
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Nilpotent orbits in type EII (continued)				
Orbit	$K_{\mathbb{C}}$ diagram	i	$\dim \mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$	Highest weights of $\mathfrak{g}_{\mathbb{C}}^i \cap \mathfrak{k}_{\mathbb{C}}$
		8	5	$(1, 1, -1, 0, 0, 0)$ $(-1, 1, 1, -1, 0, 0)$ $(0, -1, 1, 1, -1, 0)$ $(0, 0, -1, 1, 1, 0)$ $(0, 0, 0, 0, 0, 2)$
		12	3	$(1, 0, 1, -1, 0, 0)$ $(-1, 1, 0, 1, -1, 0)$ $(0, -1, 1, 0, 1, 0)$
		16	2	$(1, 0, 0, 1, -1, 0)$ $(-1, 1, 0, 0, 1, 0)$
		20	1	$(1, 0, 0, 0, 1, 0)$

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