Principal components analysis of Laplacian waveforms as a generic method for identifying ERP generator patterns: II. Adequacy of low-density estimatess

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Appendix (Supplementary Data) [*]

Table A1 lists the spatial coordinates for the 129-channel geodesic sensor net used in the current study based on a sphere with unit radius (1.0) and the notation given in the Appendix (Supplementary Data) of our parallel report (Kayser and Tenke, 2006). The spherical coordinates specified by the manufacturer (Electrical Geodesics, Inc.) were converted to angles theta, which denotes the rotation of the positive pole of the x-axis running through the 10-20 system locations T7 (-1.0) and T8 (+1.0) towards the positive pole of the y-axis running through Oz (-1.0) and Fpz (+1.0), and phi, which denotes the angular displacement from the x-y plane towards the positive pole of the z-axis running through the origin of the x-y plane (0.0) and Cz (+1.0). It should be noted that only sensors 129 (vertex) and 17 (displaced from the original mid-anterior scalp surface location to nose tip) have with sites Cz and Nose *exact* equivalents in our 31-channel EEG montage (see Tab. A1 in the Appendix (Supplementary Data) of Kayser and Tenke, 2006), which is based on the international 10-20 system (e.g., Oostenveld and Praamstra, 2001). However, most 10-20 system locations have approximate locations in the 129-channel layout (e.g., theta [174°] and phi [42°] of sensor 37 correspond roughly to the spherical coordinates of C3 [180° and 45°]; cf. Tab. A1 in the Appendix (Supplementary Data) of Kayser and Tenke, in 2006; see Fig. 5 in Srinivasan et al., 1998).

Table A1. Spherical and Cartesian Coordinates of 129-Channel Geodesic Sensor Layout

	Spherical Coordinates [degrees]		Cartesian Coordinates (Unit Sphere [radius = 1.0])		
Electrode Site	Theta	Phi	X	Y	Z
1	36.000	-22.000	0.7501	0.5450	-0.3746
2	47.000	-6.000	0.6783	0.7273	-0.1045
3	56.000	10.000	0.5507	0.8164	0.1736
4	72.000	26.000	0.2777	0.8548	0.4384
5	78.000	42.000	0.1545	0.7269	0.6691
6	90.000	58.000	0.0000	0.5299	0.8480
7	126.000	74.000	-0.1620	0.2230	0.9613
8	54.000	-22.000	0.5450	0.7501	-0.3746
9	64.000	-6.000	0.4360	0.8939	-0.1045

[*] MatLab code available at *http://psychophysiology.cpmc.columbia.edu/CN2006appendix.html*

Electrode Site	Theta	Phi	X	Y	Z
10	73.000	10.000	0.2879	0.9418	0.1736
11	90.000	26.000	0.0000	0.8988	0.4384
12	102.000	42.000	-0.1545	0.7269	0.6691
13	126.000	58.000	-0.3115	0.4287	0.8480
14	72.000	-22.000	0.2865	0.8818	-0.3746
15	81.000	-6.000	0.1556	0.9823	-0.1045
16	90.000	10.000	0.0000	0.9848	0.1736
(Nose) 17	90.000	-33.750	0.0000	0.8315	-0.5556
18	99.000	-6.000	-0.1556	0.9823	-0.1045
19	108.000	10.000	-0.3043	0.9366	0.1736
20	108.000	26.000	-0.2777	0.8548	0.4384
21	126.000	42.000	-0.4368	0.6012	0.6691
22	108.000	-22.000	-0.2865	0.8818	-0.3746
23	116.000	-6.000	-0.4360	0.8939	-0.1045
24	126.000	10.000	-0.5789	0.7967	0.1736
25	126.000	26.000	-0.5283	0.7271	0.4384
26	126.000	-22.000	-0.5450	0.7501	-0.3746
27	133.000	-6.000	-0.6783	0.7273	-0.1045
28	142.000	10.000	-0.7760	0.6063	0.1736
29	144.000	26.000	-0.7271	0.5283	0.4384
30	150.000	42.000	-0.6436	0.3716	0.6691
31	162.000	58.000	-0.5040	0.1638	0.8480
32	-162.000	74.000	-0.2621	-0.0852	0.9613
33	144.000	-22.000	-0.7501	0.5450	-0.3746
34	150.000	-6.000	-0.8613	0.4973	-0.1045
35	159.000	10.000	-0.9194	0.3529	0.1736
36	162.000	26.000	-0.8548	0.2777	0.4384
37	174.000	42.000	-0.7391	0.0777	0.6691
38	-162.000	58.000	-0.5040	-0.1638	0.8480
39	162.000	-22.000	-0.8818	0.2865	-0.3746
40	167.000	-6.000	-0.9690	0.2237	-0.1045
41	176.000	10.000	-0.9824	0.0687	0.1736
42	180.000	26.000	-0.8988	0.0000	0.4384
43	-162.000	42.000	-0.7068	-0.2296	0.6691
44	150.000	-38.000	-0.6824	0.3940	-0.6157
45	180.000	-22.000	-0.9272	0.0000	-0.3746
46	-176.000	-6.000	-0.9921	-0.0694	-0.1045
47	-167.000	10.000	-0.9596	-0.2215	0.1736
48	-162.000	26.000	-0.8548	-0.2777	0.4384
49	170.000	-38.000	-0.7760	0.1368	-0.6157

Electrode Site	Theta	Phi	X	Y	Z
50	-159.000	-6.000	-0.9285	-0.3564	-0.1045
51	-150.000	10.000	-0.8529	-0.4924	0.1736
52	-144.000	26.000	-0.7271	-0.5283	0.4384
53	-138.000	42.000	-0.5523	-0.4973	0.6691
54	-126.000	58.000	-0.3115	-0.4287	0.8480
55	-90.000	74.000	0.0000	-0.2756	0.9613
56	-170.000	-38.000	-0.7760	-0.1368	-0.6157
57	-157.000	-22.000	-0.8535	-0.3623	-0.3746
58	-142.000	-6.000	-0.7837	-0.6123	-0.1045
59	-133.000	10.000	-0.6716	-0.7202	0.1736
60	-126.000	26.000	-0.5283	-0.7271	0.4384
61	-114.000	42.000	-0.3023	-0.6789	0.6691
62	-90.000	58.000	0.0000	-0.5299	0.8480
63	-150.000	-38.000	-0.6824	-0.3940	-0.6157
64	-139.000	-22.000	-0.6998	-0.6083	-0.3746
65	-125.000	-6.000	-0.5704	-0.8147	-0.1045
66	-116.000	10.000	-0.4317	-0.8851	0.1736
67	-108.000	26.000	-0.2777	-0.8548	0.4384
68	-90.000	42.000	0.0000	-0.7431	0.6691
69	-130.000	-38.000	-0.5065	-0.6037	-0.6157
70	-122.000	-22.000	-0.4913	-0.7863	-0.3746
71	-108.000	-6.000	-0.3073	-0.9458	-0.1045
72	-99.000	10.000	-0.1541	-0.9727	0.1736
73	-90.000	26.000	0.0000	-0.8988	0.4384
74	-110.000	-38.000	-0.2695	-0.7405	-0.6157
75	-100.000	-22.000	-0.1610	-0.9131	-0.3746
76	-90.000	-6.000	0.0000	-0.9945	-0.1045
77	-81.000	10.000	0.1541	-0.9727	0.1736
78	-72.000	26.000	0.2777	-0.8548	0.4384
79	-66.000	42.000	0.3023	-0.6789	0.6691
80	-54.000	58.000	0.3115	-0.4287	0.8480
81	-18.000	74.000	0.2621	-0.0852	0.9613
82	-90.000	-38.000	0.0000	-0.7880	-0.6157
83	-80.000	-22.000	0.1610	-0.9131	-0.3746
84	-72.000	-6.000	0.3073	-0.9458	-0.1045
85	-64.000	10.000	0.4317	-0.8851	0.1736
86	-54.000	26.000	0.5283	-0.7271	0.4384
87	-42.000	42.000	0.5523	-0.4973	0.6691
88	-18.000	58.000	0.5040	-0.1638	0.8480
89	-70.000	-38.000	0.2695	-0.7405	-0.6157

Electrode Site	Theta	Phi	X	Y	Z
90	-59.000	-22.000	0.4775	-0.7948	-0.3746
91	-55.000	-6.000	0.5704	-0.8147	-0.1045
92	-47.000	10.000	0.6716	-0.7202	0.1736
93	-36.000	26.000	0.7271	-0.5283	0.4384
94	-18.000	42.000	0.7068	-0.2296	0.6691
95	-50.000	-38.000	0.5065	-0.6037	-0.6157
96	-41.000	-22.000	0.6998	-0.6083	-0.3746
97	-38.000	-6.000	0.7837	-0.6123	-0.1045
98	-30.000	10.000	0.8529	-0.4924	0.1736
99	-18.000	26.000	0.8548	-0.2777	0.4384
100	-30.000	-38.000	0.6824	-0.3940	-0.6157
101	-23.000	-22.000	0.8535	-0.3623	-0.3746
102	-21.000	-6.000	0.9285	-0.3564	-0.1045
103	-13.000	10.000	0.9596	-0.2215	0.1736
104	0.000	26.000	0.8988	0.0000	0.4384
105	6.000	42.000	0.7391	0.0777	0.6691
106	18.000	58.000	0.5040	0.1638	0.8480
107	54.000	74.000	0.1620	0.2230	0.9613
108	-10.000	-38.000	0.7760	-0.1368	-0.6157
109	-4.000	-6.000	0.9921	-0.0694	-0.1045
110	4.000	10.000	0.9824	0.0687	0.1736
111	18.000	26.000	0.8548	0.2777	0.4384
112	30.000	42.000	0.6436	0.3716	0.6691
113	54.000	58.000	0.3115	0.4287	0.8480
114	10.000	-38.000	0.7760	0.1368	-0.6157
115	0.000	-22.000	0.9272	0.0000	-0.3746
116	13.000	-6.000	0.9690	0.2237	-0.1045
117	21.000	10.000	0.9194	0.3529	0.1736
118	36.000	26.000	0.7271	0.5283	0.4384
119	54.000	42.000	0.4368	0.6012	0.6691
120	30.000	-38.000	0.6824	0.3940	-0.6157
121	18.000	-22.000	0.8818	0.2865	-0.3746
122	30.000	-6.000	0.8613	0.4973	-0.1045
123	38.000	10.000	0.7760	0.6063	0.1736
124	54.000	26.000	0.5283	0.7271	0.4384
125	50.000	-38.000	0.5065	0.6037	-0.6157
126	70.000	-38.000	0.2695	0.7405	-0.6157
127	110.000	-38.000	-0.2695	0.7405	-0.6157
128	130.000	-38.000	-0.5065	0.6037	-0.6157
(Cz) 129	0.000	90.000	0.0000	0.0000	1.0000