

Secular spin-axis dynamics of exoplanets (*Corrigendum*)

M. Saillenfest, J. Laskar, and G. Boué

IMCCE, Observatoire de Paris, PSL Research University, CNRS, Sorbonne Université, LAL, Université de Lille, 75014 Paris, France
e-mail: melaine.saillenfest@obspm.fr

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Some errors have occurred during the production of the original article.

In Sect. 3.3, last but one paragraph, a unit was incorrect in the second sentence. It should read: “Using the average density of the Earth, we obtain a minimum rotation period of about 2.4 h, leading to a maximum precession constant of about $230'' \text{ yr}^{-1}$. The true value for the Earth is $20'' \text{ yr}^{-1}$, or $50'' \text{ yr}^{-1}$ if we include the additional effects of the Moon (Laskar & Robutel 1993).”

In Appendix F, the titles of Tables F.2, F.3 and F.4 have been mistakenly replaced by “Table F.1. continued”. Here, we publish these tables with their correct names. In the text, the citations of “Table F.1” should read “Tables F.1–F.4”.

References

- Laskar, J. 1990, *Icarus*, 88, 266
Laskar, J., & Robutel, P. 1993, *Nature*, 361, 608

Table F.1. Quasi-periodic representation of the orbital dynamics of Mercury.

z			ζ		
μ_j (″/yr)	$E_j \times 10^8$	$\theta_j^{(0)}$ (°)	ν_j (″/yr)	$S_j \times 10^8$	$\phi_j^{(0)}$ (°)
5.59644	18337396	110.35	-5.61755	3995819	348.70
5.47449	6902428	275.01	-7.07963	3015900	273.77
5.71670	5240271	120.52	-7.19493	1505361	105.16
4.24882	3635276	30.67	-6.96094	1429554	97.95
5.35823	2815900	94.89	-5.50098	1424811	342.89
7.45592	2786428	20.24	0.00000	1372386	107.59
4.36906	1312738	220.84	-6.84091	1183049	107.89
5.99227	1035633	113.56	-7.33264	872607	196.75
5.65485	998897	39.22	-5.85017	481844	165.47
6.93423	934569	166.16	-5.21610	360659	18.91
5.23841	829067	272.97	-5.37178	358805	35.48
7.05595	634974	357.62	-5.10025	351141	195.38
7.34103	235292	27.85	-6.73842	285961	44.50
17.91550	165568	335.25	-7.40536	264351	233.35
7.57299	164186	191.47	-7.48780	245583	47.95
17.36469	157893	303.95	-6.56016	230801	303.47
6.82468	77097	14.53	-5.96899	205822	350.64
16.81285	70120	91.98	-8.42342	192248	211.21
3.08952	60554	121.36	-3.00557	159813	140.33
18.46794	48514	9.97	-18.85115	156874	240.43
7.20563	48115	323.91	-6.15490	149031	89.77
17.08266	43934	359.38	-17.74818	119892	303.28
17.63081	39761	202.03	-0.69189	70222	23.96
7.71663	29983	273.52	18.14984	53922	111.19
28.22069	21356	307.83	-18.30007	47541	269.86
17.81084	15980	58.56	-19.40256	33322	29.01
19.01870	15738	39.75	-19.13075	14506	125.90
17.15752	15119	145.02	-26.33023	13964	127.29
18.18553	14604	57.28	-18.01114	9092	62.09
17.72293	12073	48.46	-17.66094	8620	318.93
18.01611	10275	44.83	-17.83857	7011	109.13
16.52731	9115	311.91	-17.54636	6248	66.71
17.47683	7950	80.26	-18.97001	6027	253.36
16.26122	7118	58.89	-2.35835	4687	44.73
17.55234	6398	17.65	-17.94404	4398	32.26
5.40817	6086	120.60	-18.59563	4035	278.11
18.08627	5933	356.17	-1.84625	3435	41.72
52.19257	3589	225.59	-4.16482	3303	51.62
-19.72306	2363	113.24	-18.69743	3167	41.70
4.89647	922	292.23	-18.77933	3104	42.83
0.66708	717	73.98	-18.22681	3100	226.30
1.93168	618	39.55	-19.06544	2777	230.21
3.60029	447	121.40	-17.19656	1298	127.26
-56.90922	400	44.11	-3.11725	1067	326.97
53.35188	285	134.98	-0.58033	683	17.33
29.37998	169	37.61	-1.19906	372	133.87
2.97706	158	306.81	11.50319	341	281.02
-20.88236	75	203.93	-26.97744	244	44.61
28.86795	70	212.64	-50.30212	202	29.83
27.57346	62	223.74	0.46547	196	286.88
1.82121	50	146.09	10.34389	179	191.52
27.06140	45	38.56	20.96631	132	57.78
76.16447	16	323.03	0.57829	68	103.72
0.77840	12	65.10	82.77163	61	128.95
51.03334	9	136.30	9.18847	39	1.15
-0.49216	4	164.74	58.80017	36	212.90
			34.82788	28	294.12
			-27.48935	18	218.53
			-25.17116	17	215.94
			-28.13656	11	314.08

Notes. This representation is used in Fig. 3. It has been directly obtained from Laskar (1990), see text.

Table F.2. Quasi-periodic representation of the orbital dynamics of Venus.

z			ζ		
μ_j (″/yr)	$E_j \times 10^8$	$\theta_j^{(0)}$ (°)	ν_j (″/yr)	$S_j \times 10^8$	$\phi_j^{(0)}$ (°)
7.45592	2085594	200.24	0.00000	1377170	107.59
4.24882	1963621	30.67	-18.85115	953835	60.43
17.91550	1346128	335.25	-5.61755	671575	348.70
17.36469	1164633	123.95	-17.74818	575205	123.28
5.59644	659312	110.35	-7.07963	404368	93.77
17.08266	324058	179.38	-18.30007	298364	89.80
5.47449	248173	275.01	-5.50098	239467	342.89
16.81285	239435	274.43	-6.84091	208804	286.39
6.93423	216696	169.77	-7.19493	201837	285.16
17.63081	191660	193.67	-6.96094	191673	277.95
5.71670	188411	120.52	-19.40256	188959	209.10
7.05595	178786	358.98	-7.33264	116984	16.75
7.34103	176112	207.85	-3.00557	99208	140.33
17.81084	129713	58.56	-19.13075	88217	305.90
7.57299	122891	11.47	-5.85017	80983	165.47
18.18553	118540	57.28	-0.69189	65885	23.96
19.01870	116085	219.75	-5.21610	60616	18.91
17.15752	111520	325.02	-5.37178	60304	35.48
18.46794	110955	6.95	-5.10025	59016	195.38
5.35823	101244	94.89	-18.01114	43620	242.09
17.72293	97999	48.46	-17.66094	41358	138.93
18.01611	83405	44.83	-6.73842	38337	224.50
16.52731	67232	131.91	-18.97001	36654	73.36
17.47683	58638	260.26	-7.40536	35440	53.35
16.26122	57777	58.89	-5.96899	34592	350.64
6.82468	57706	194.53	-17.83857	33636	289.13
3.08952	54138	121.36	-7.48780	32924	227.95
18.08627	48156	356.17	-6.56016	30942	123.47
17.55234	47190	197.65	-17.54636	29977	246.71
5.99227	37236	113.56	-8.42342	25773	31.21
7.20563	36013	143.91	-6.15490	25048	89.77
5.65485	35915	39.22	-17.94404	21099	212.26
5.23841	29809	272.97	-18.59563	19361	98.11
7.71663	22441	93.52	-18.69743	19259	221.70
4.36906	20218	220.79	-18.77933	18879	222.83
28.22069	16949	308.38	-18.22681	18853	46.30
5.40817	3036	120.48	-19.06544	16888	50.21
-19.72306	1161	113.24	-17.19656	11902	171.81
0.66708	1088	73.98	18.14984	9063	111.19
27.06140	536	218.72	-26.33023	5577	127.29
4.89647	470	291.97	-2.35835	2677	44.72
29.37998	416	217.51	-1.84625	2187	40.13
52.19257	339	225.73	-4.16482	2022	51.60
28.86795	277	32.64	-3.11725	663	326.97
27.57346	244	43.74	-0.58033	641	17.33
3.60029	242	121.40	-50.30212	215	29.83
-56.90922	216	44.11	11.50319	212	281.02
2.97706	141	306.81	-1.19906	194	133.77
1.93168	69	93.94	0.46547	184	286.88
-20.88236	67	203.93	-26.97744	128	44.89
76.16447	63	143.03	10.34389	98	191.39
1.82121	46	148.00	20.96631	82	57.78
51.03334	35	316.30	0.57829	64	103.72
0.77840	19	65.10	9.18847	36	1.15
53.35188	16	135.62	82.77163	24	128.95
-0.49216	5	164.74	58.80017	14	212.90
			34.82788	11	294.12
			-27.48935	7	218.53
			-25.17116	7	215.94
			-28.13656	5	314.08

Notes. This representation is used in Fig. 3. It has been directly obtained from Laskar (1990), see text.

Table F.3. Quasi-periodic representation of the orbital dynamics of Earth.

z			ζ		
μ_j ("/yr)	$E_j \times 10^8$	$\theta_j^{(0)}$ (°)	ν_j ("/yr)	$S_j \times 10^8$	$\phi_j^{(0)}$ (°)
4.24882	1891285	30.67	0.00000	1377263	107.59
7.45592	1614222	200.24	-18.85115	875509	240.43
17.91550	1315949	155.25	-5.61755	496020	348.70
17.36469	938579	303.95	-17.74818	401987	303.28
5.59644	420011	110.35	-7.07963	343071	93.77
17.08266	261159	359.38	-18.30007	281401	269.74
17.63081	197777	14.78	-5.50098	176869	342.89
28.22069	168931	128.09	-6.84091	174079	286.47
16.81285	168064	95.11	-7.19493	171242	285.16
6.93423	161978	169.87	-6.96094	162618	277.95
5.47449	158097	275.01	-19.40256	162229	29.19
7.34103	136309	207.85	-26.33023	133519	127.29
7.05595	134274	359.01	-7.33264	99249	16.75
18.46794	131495	187.69	-3.00557	89258	140.33
17.81084	126776	238.56	-19.13075	80968	125.90
5.71670	120026	120.52	-0.69189	64554	23.96
18.18553	115855	237.28	-5.85017	59814	165.47
17.72293	95780	228.46	-5.21610	44770	18.91
7.57299	95116	11.47	-5.37178	44540	35.48
19.01870	93553	39.75	-5.10025	43589	195.38
17.15752	89874	145.02	-18.97001	33642	253.36
18.01611	81516	224.83	-6.73842	32525	224.50
5.35823	64497	94.89	-18.01114	30484	62.09
3.08952	56656	121.36	-7.40536	30067	53.35
16.26122	56468	238.89	-17.66094	28903	318.93
16.52731	54183	311.91	-7.48780	27932	227.95
17.47683	47256	80.26	-6.56016	26251	123.47
18.08627	47065	176.17	-17.19656	25667	341.65
6.82468	44664	194.53	-5.96899	25550	350.64
17.55234	38030	17.65	-17.83857	23507	109.13
7.20563	27874	143.91	-8.42342	21866	31.21
5.99227	23721	113.56	-17.54636	20949	66.71
5.65485	22879	39.22	-6.15490	18500	89.77
5.23841	18989	272.97	-18.69743	17676	41.70
7.71663	17369	93.52	-18.77933	17327	42.83
4.36906	9354	220.76	-18.22681	17304	226.30
52.19257	7041	225.56	-19.06544	15500	230.21
5.40817	2871	120.45	-17.94404	14745	32.26
29.37998	1761	37.54	-18.59563	13530	278.11
27.06140	1669	38.70	18.14984	6694	111.19
-19.72306	1591	113.24	-2.35835	2098	44.69
0.66708	1259	73.98	-1.84625	1981	39.73
28.86795	1027	212.64	-4.16482	1812	51.59
27.57346	902	223.74	-26.97744	1074	43.23
53.35188	584	134.92	-0.58033	628	17.33
4.89647	447	291.91	-3.11725	596	326.97
76.16447	233	323.03	82.77163	581	128.95
3.60029	233	121.40	58.80017	341	212.90
-56.90922	208	44.11	34.82788	269	294.12
2.97706	148	306.81	11.50319	191	281.02
51.03334	129	136.30	0.46547	181	286.88
1.93168	70	148.98	-27.48935	173	218.53
-20.88236	70	203.93	-1.19906	167	133.74
1.82121	49	148.46	-25.17116	163	215.94
0.77840	22	65.10	-28.13656	108	314.08
-0.49216	6	164.74	10.34389	85	191.35
			20.96631	74	57.78
			0.57829	62	103.72
			9.18847	36	1.15
			-50.30212	25	29.78

Notes. This representation is used in Fig. 3. It has been directly obtained from Laskar (1990), see text.

Table F.4. Quasi-periodic representation of the orbital dynamics of Mars.

z			ζ		
μ_j ("/yr)	$E_j \times 10^8$	$\theta_j^{(0)}$ (°)	ν_j ("/yr)	$S_j \times 10^8$	$\phi_j^{(0)}$ (°)
17.91550	4902750	335.25	-17.74818	3464962	303.28
17.36469	4004873	303.95	-18.85115	1541097	60.43
4.24882	2030021	30.67	0.00000	1375324	107.59
16.81285	1853846	91.90	-18.30007	745752	89.07
18.46794	1357476	9.91	-17.19656	543058	154.89
17.63081	1139332	201.65	-26.33023	457927	127.29
17.08266	1114353	359.38	-18.01114	262761	62.09
28.22069	706337	128.11	-17.66094	249135	318.93
17.81084	472390	58.56	-17.83857	202620	109.13
18.18553	431698	57.28	-17.54636	180575	66.71
19.01870	399188	39.75	-19.13075	142530	305.90
17.15752	383488	145.02	-17.94404	127098	32.26
17.72293	356895	48.46	-18.59563	116625	278.11
18.01611	303744	44.83	-5.61755	105161	348.70
7.45592	295700	200.24	-19.40256	85957	23.33
16.52731	231195	311.91	-7.07963	77142	93.77
16.26122	210411	58.89	-3.00557	63897	140.33
17.47683	201641	80.26	-0.69189	60870	23.96
18.08627	175373	356.17	-18.97001	59221	73.36
17.55234	162274	17.65	-6.84091	38863	286.50
3.08952	73627	121.36	-7.19493	38505	285.16
52.19257	26717	225.55	-5.50098	37498	342.89
6.93423	25209	170.37	-6.96094	36566	277.95
7.34103	24970	207.85	-18.69743	31116	221.70
7.05595	21406	359.16	-18.77933	30502	222.83
7.57299	17424	11.47	-18.22681	30460	46.30
6.82468	8182	194.53	-19.06544	27285	50.21
29.37998	8059	37.54	-7.33264	22307	16.75
27.06140	8027	38.70	-5.85017	12681	165.47
5.59644	6750	110.35	-5.21610	9492	18.91
7.20563	5106	143.91	-5.37178	9443	35.48
28.86795	4795	212.64	-5.10025	9241	195.38
27.57346	4212	223.74	-6.73842	7310	224.50
7.71663	3182	93.52	-7.40536	6758	53.35
4.36906	3180	40.88	-7.48780	6278	227.95
-19.72306	3055	113.24	-6.56016	5900	123.47
5.40817	2931	120.37	-5.96899	5417	350.64
5.47449	2541	275.01	-8.42342	4915	31.21
53.35188	2250	134.91	-6.15490	3922	89.77
0.66708	2008	73.98	-26.97744	3471	43.07
5.71670	1929	120.52	82.77163	1993	128.95
76.16447	1090	323.03	-1.84625	1457	38.22
5.35823	1037	94.89	18.14984	1419	111.19
51.03334	605	136.30	-4.16482	1278	51.57
4.89647	464	291.74	58.80017	1169	212.90
5.99227	381	113.56	34.82788	924	294.12
5.65485	368	39.22	-2.35835	628	44.46
5.23841	305	272.97	-0.58033	592	17.33
3.60029	250	121.40	-27.48935	592	218.53
1.93168	227	192.09	-25.17116	559	215.94
-56.90922	223	44.11	-50.30212	458	209.84
2.97706	192	306.81	-3.11725	427	326.97
-20.88236	91	203.93	-28.13656	371	314.08
1.82121	65	149.54	0.46547	170	286.88
0.77840	35	65.10	11.50319	136	281.02
-0.49216	10	164.74	-1.19906	96	133.57
			0.57829	59	103.72
			20.96631	53	57.78
			10.34389	52	191.16
			9.18847	33	1.15

Notes. This representation is used in Fig. 3. It has been directly obtained from Laskar (1990), see text.