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Orbital elements of double stars: ADS 7435 and ADS 7785

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INTERNATIONAL ASTRONOMICAL UNION

COMMISSION G1 (BINARY AND MULTIPLE STAR SYSTEMS)

DOUBLE STARS INFORMATION CIRCULAR No. 192 (JUNE 2017)

NEW ORBITS

ADS α2000δ	Name n	P a	T i	e ω	Ω(2000) Last ob.	2017 2018	Author(s)
207 00162+7657	STF 13 0°2890	1245^{y}6 1″078	3048.6 140°7	0.472 287°6	86°1 2016.7850	48°5 0″956 48.3 0.957	MASON & HARTKOPF
884 01048+0135	A 2310 1.8462	195.0 0.212	1936.4 130.0	0.730 351.7	124.3 2008.7726	314.6 0.351 314.3 0.353	DOCOBO & LING
- 02104-5049	ESG 1 1.0540	341.5 4.393	2000.5 125.4	0.49 306.4	79.6 2012.2468	80.1 2.574 78.6 2.611	MASON & HARTKOPF
- 08269+3212	HU 714Ba,Bb 1.8410	195.5 0.535	1943.2 72.4	0.567 3.7	135.9 2009.0625	312.4 0.787 312.6 0.792	MASON & HARTKOPF
7435 09349+0515	A 2757 1.4331	251.2 0.322	2065.5 132.4	0.192 99.8	58.7 2017.148	53.0 0.310 52.0 0.308	LING et al (*)
7785 10287+4558	A 1993 0.1685	2137. 2.046	1991. 52.6	0.822 29.1	124.3 2017.268	219.1 0.296 221.8 0.302	LING et al (*)
9547 15136+3453	HO 60 1.8404	195.61 0.314	1972.18 107.6	0.562 163.5	37.7 2009.4413	61.5 0.235 60.7 0.243	DOCOBO & CAMPO
- 15317+0053	TOK 48 212.2642	1.696 0.042	2006.183 160.5	0.406 223.2	171.4 2015.4967	150.3 0.056 338.4 0.026	DOCOBO & CAMPO
10230 16514+0113	STT 315 0.3636	990. 1.556	1976.7 114.3	0.798 82.5	133.7 2014.658	309.4 0.737 309.0 0.747	DOCOBO & LING
11667 18465-0058	MCA 53Aa,Ab 8.7209	41.28 0.103	2012.50 127.3	0.666 358.0	164.8 2014.3038	32.7 0.062 23.8 0.076	DOCOBO & CAMPO
12126 19110-0726	A 95 3.3111	108.72 0.246	1944.25 129.7	0.647 253.2	115.2 2015.5409	23.1 0.237 21.4 0.235	DOCOBO & CAMPO

NEW ORBITS (continuation)

ADS α2000δ	Name n	P a	T i	e ω	Ω(2000) Last ob.	2017 2018	Author(s)
-	YSC 134	0.4568	2012.4410	0.137	25.1	159.4 0.019	DOCOBO
19264+4928	788.1256	0.026	138.0	243.2	2014.5640	57.7 0.023	et al (**)
12469	SCJ 22	170.2	1983.91	0.584	206.	289.6 1.113	MASON &
19282-1209	2.1154	1.003	10.4	308.	2016.5529	290.9 1.131	HARTKOPF
13135	HU 687	154.6	1960.63	0.321	28.9	38.2 0.198	DOCOBO
19549+5049	2.3286	0.159	36.2	218.9	2008.639	39.4 0.199	& CAMPO
13738	HLD 158	232.4	1961.16	0.746	218.3	42.0 1.198	MASON &
20213+0250	1.5493	0.858	128.6	17.7	2016.8750	41.7 1.209	HARTKOPF
-	KUI 112Aa,Ab	52.44	2022.70	0.677	123.8	303.1 0.419	DOCOBO
22329+5348	6.8650	0.495	38.4	301.2	2008.648	309.3 0.370	& LING
16457	A 194	104.28	1990.26	0.079	108.0	273.1 0.063	DOCOBO
23020+4800	3.4522	0.206	94.7	151.6	2008.631	269.5 0.052	& LING
16672	MCA 74 Aa,Ab	6.321	2012.286	0.193	340.7	260.0 0.138	DOCOBO
23191-1328	56.9530	0.188	45.5	29.5	2014.7632	326.0 0.156	et al (***)
-	COU 439	64.33	1955.87	0.314	13.4	15.3 0.135	DOCOBO
23199+2844	5.5961	0.188	51.4	38.1	2009.6849	22.0 0.130	& LING

(*) LING, SCARDIA, PRIEUR, PANSECCHI, ARGYLE, ZANUTTA, ARISTIDI, ABE, BENDJOYA, COMBIER-DIMUR, RIVET, SUAREZ & VERNET
(**) DOCOBO, CAMPO & HORCH
(***) DOCOBO, TAMAZIAN & CAMPO

NEW LINEAR FITS

Authors: SCARDIA, PRIEUR, PANSECCHI, ARGYLE, LING, ARISTIDI, ZANUTTA, ABE, BENDJOYA, COMBIER-DIMUR, RIVET, SUAREZ & VERNET

ADS α**2000**δ	**Name** **-**	X_0 Y_0	X_A Y_A	ρ_0 θ_0	T_0 **Last ob.**	**2017** **2018**
739	HU 1018	0.2539267	0.0072018	0.740	1941.767	58°0 0″938
00542+5108	-	-0.6951196	0.0026302	20.07	2015.940	58.4 0.943
3593	STF 619	1.9510580	-0.0211175	4.183	1993.235	160.0 4.234
05013+5015	-	3.7003640	0.0117062	152.20	2016.037	160.3 4.238
8708	STT 256	0.3953297	0.0034690	0.580	1824.086	100.6 1.083
12564-0057	-	-0.4240143	0.0032338	42.99	2017.383	100.8 1.087
9952	A 1799	-0.0118427	0.0066318	0.331	1906.076	116.3 0.807
16115+1507	-	0.3311701	0.0002413	182.05	2017.383	116.1 0.814
10648	A 1879	0.2362047	0.0029091	0.289	1926.771	112.5 0.540
17354+1322	-	-0.1663343	0.0041279	54.85	2016.616	112.7 0.544

NEW DOUBLE STARS

Discovered by: André Amossé using a ZWO ASI camera 290 MMc attached to the 33 cm diameter refractor of the Lille Observatory

STAR	**Precise Coord.**	**UCAC4**	**Mag.**	**Epoch**	θ (°)	ρ (″)
AMS 2	215451.222+191410.71	547-138527	10.23	2016.691	199.3	6.9
	215451.056+191404.06	547-138526	10.23			
AMS 3	074245.977+040414.93	HD6 2161	7.95	2017.236	159.4	19.10
	074246.391+040356.61	471-034418	12.41			
AMS 4	062305.640+250510.80	576-028537	10.17	2017.326	262.5	8.2
	062305.037+250509.66	576-028533	10.12			
AMS 5	124040.962+071958.74	487-053873	11.28	2017.326	1.2	12.1
	124040.980+072010.74	487-053874	12.89			

NEW DOUBLE STARS

Discovered by A. Debackère using LCOGT global telescope network.

- FTN : Faulkes Telescope North T2m, Haleakala, Hawaii, LCOGT
- FTS : Faulkes Telescope South T2m, Siding Spring, Australia, LCOGT

STAR	Precise Coord.	UCAC4 USNO-B1.0	Mag.		Epoch	θ (°)	ρ (″)	Obs
DBR 244	081058.66+280722.3	591-044393	4.75	14.0	2016.978	138.7	17.2	1FTS,9FTN
DBR 245	152235.57+560342.4	731-053126	1.84	13.9	2017.100	219.9	16.7	1FTN
DBR 246	153223.28+562750.0	1464-0260501	3.11	17.1	2017.114	306.0	17.8	1FTN
DBR 247	153207.13+562744.6	733-056033	5.82	16.4	2017.114	281.5	16.8	1FTN
DBR 248	153636.30+461133.9	681-056532	9.21	15.0	2017.114	272.6	15.1	1FTN
DBR 249	153642.04+463211.4	1365-0254918	7.99	17.5	2017.114	69.7	17.5	1FTN
DBR 250	153734.15+461441.4	682-055398	5.12	15.3	2017.114	62.8	17.9	1FTN
DBR 251	153758.93+462140.4	682-055406	9.11	13.1	2017.114	175.8	16.2	1FTN
DBR 252	153741.66+461942.0	682-055401	9.80	13.2	2017.114	246.7	14.7	1FTN
DBR 253	153746.43+462542.3	1364-0255182	4.07	18.1	2017.114	99.4	19.1	1FTN
DBR 254	153748.71+462359.2	1363-0253692	5.79	16.8	2017.114	263.0	18.0	1FTN
DBR 255	153756.89+463357.2	683-058173	6.51	15.5	2017.114	161.9	17.2	1FTN
DBR 256	153813.45+462820.7	683-058178	7.90	16.0	2017.114	42.8	16.8	1FTN
DBR 257	153859.66+461050.9	1350-08675105	3.41	17.3	2017.114	64.0	18.4	1FTN
DBR 258	165152.58-375022.4	0521-0579060	1.57	16.5	2017.150	309.6	17.8	1FTS
DBR 259	165156.20-375058.5	261-104581	3.14	12.3	2017.150	196.3	16.5	1FTS
DBR 260	165154.48-375640.3	261-104572	3.29	15.4	2017.152	134.2	16.4	2FTS
DBR 261	165201.35-375347.7	261-104612	3.37	14.5	2017.152	124.9	17.1	2FTS
DBR 262 AB	165202.56-375131.8	261-104618	6.09	14.5	2017.152	348.2	15.3	2FTS
DBR 262 AC	165202.56-375131.8	261-104618	4.17	14.5	2017.152	182.2	16.4	2FTS
DBR 263	165202.65-375103.6	261-104620	3.88	13.9	2017.152	350.1	15.9	2FTS
DBR 264	165207.78-375134.3	261-104653	1.69	14.7	2017.156	34.6	-	1FTS
DBR 265	165207.81-375037.7	261-104654	1.35	14.7	2017.150	287.2	15.0	1FTS
DBR 266	165210.67-375136.1	261-104668	2.94	15.3	2017.152	25.3	16.8	2FTS
DBR 267	165217.07-375638.1	261-104698	4.56	15.0	2017.152	359.7	16.2	2FTS
DBR 268	165218.18-375647.7	261-104705	4.85	12.3	2017.512	147.6	15.8	2FTS
DBR 269	165225.62-375400.5	261-104745	2.10	16.3	2017.512	179.7	16.4	2FTS
DBR 270 AB	165229.32-375825.4	261-104763	1.38	15.1	2017.510	202.0	15.8	1FTS
DBR 270 AC	165229.32-375825.4	261-104763	2.45	15.1	2017.510	351.6	16.5	1FTS
DBR 271	165233.49-375005.7	261-104787	1.56	16.6	2017.510	167.2	17.0	1FTS

ANNOUNCEMENTS

ON CONVERSION FROM BESSELIAN EPOCH TO JULIAN EPOCH

Despite IAU resolutions (1) recommending that observations be published using dates given in Julian epochs, classic double star data have primarily been published with the date of observation given in fractional Besselian years. More recent data has a much greater probability of being published in fractional Julian years. The ambiguity of the fractional year is an untenable situation, especially for orbit computation of short period pairs, and the difference between the Besselian epoch and the Julian epoch is increasing. We are in the process of evaluating the 9341 references used in the compilation of the WDS and adjusting the observation epoch from BE to JE when appropriate. Accordingly, the measures in the WDS are being converted from Besselian to Julian epoch when the published precision warrants it, using the IAU approved conversion,

$$JY = (BY \times 0.999978641) + 0.041439661$$

(1) IAU, 1977, Proceedings of the Sixteenth General Assembly, Grenoble 1976, Trans. IAU, XVIB (Dordrecht: Reidel)

Brian D. Mason & William I. Hartkopf

THE WASHINGTON DOUBLE STAR SUPPLEMENTAL CATALOG (v 2017.06.08)

The Washington Double Star Supplemental Catalog (WDSS) is a database intended for large, faint duplicity surveys. This initial version only contains the 105,000-pair SDSS survey by Dhital et al. (2015 AJ 150, 57), with additional matches of some pairs against 2MASS. However, it is expected to grow significantly as future data releases from Gaia, PanStarrs, etc. lead to ever-larger-scale duplicity surveys.

The WDSS is also meant to be a means of testing possible new formats for the main WDS database, so the format of this catalog must be considered preliminary. The increasing number of pairs in the WDS have occasionally exposed the limitations of its current format. In particular, the WDS designation, based on arcminute-precise coordinates, has insufficient precision to give unique designations to pairs discovered in crowded fields. WDS summary lines also have insufficient space for cross-reference names for the primary, and no space for coordinates or other names for the secondary. Space is also limited for component designations, magnitudes, spectral types, and proper motions.

The initial format for the WDSS attempts to address some of these shortcomings:

1. The system designation has been expanded from 10 to 14 characters, and is now based on the arcsecond-precise coordinates of the primary. This format is common to many other contemporary catalogs.

2. The component field now accepts designations up to seven characters in length (e.g., the designation "Aa1,Aa2" used for a very close pair in a higher-order hierarchical systems), as opposed to the five-character limit in the WDS.

3. Both visual and infrared magnitudes are included (with flags for data taken with filters other than the default V and K).

4. Space has been expanded for spectral types of each component, as well as proper motions.

5. A column has been added for parallax

6. More space is available for alternate names for both components

7. Space is given for precise coordinates of the secondary.

In order to accomodate this additional information, the summary line has been split into two lines. (Note that this applies only to the plain-text version of the database. An SQL-type database - not yet implemented - could of course continue to use a single summary line per pair.) An example of the WDSS format is given below. The layout is similar to that of the WDS (especially measurement lines, which are virtually identical other than the WDS-vs-WDSS designation). Detailed formats for both summary and measurements lines are given in the file wdss_format.txt. The final three columns (as-yet unused) are at present reserved for any pairs found to be common to both the WDSS and the WDS. Eventually they will give a cross-reference between the new-and old-format WDS catalogs.

This format is by NO means "written in stone"! Suggestions for improvement are welcome from all users of the USNO double star catalogs.

```
-----------------------------------------------------------------------------------------------------------------------------------------------------------
wdss..........  comp1.. frst nnn th1 rho1..* vmag1* kmag1* spec1 pm1............. par1... name1................... ** coords1........... wds....... dd.....comp.
wdss..........  comp2.. last     th2 rho2..* vmag2* kmag2* spec2 pm2............. par2... name2...................    coords2...........
wdss.......... comps... date...... *the.... dthe.. *rho...... *dsep... *mag1..*dmag. *mag2..*dmag. filt....* tel..* nn ref..... te
...
-----------------------------------------------------------------------------------------------------------------------------------------------------------
0000004+054750 A        2008   1  25  13.17  20.87g   .    K7         .       .       .   SLW 0000+0547             V 000000.44+054750.7
0000004+054750 B        2008      25  13.17  22.08g   .    M1         .       .       .                               000000.82+054802.6
0000004+054750  AB      2008.8151    25.      .      13.17     .       26.285 0.449  24.040 0.985  355 120    2.5   1 Dhi2015  Es
0000004+054750  AB      2008.8151      .      .        .       .       20.868 0.038  22.083 0.103  477 280    2.5   1 Dhi2015  Es
0000004+054750  AB      2008.8151      .      .        .       .       19.479 0.017  20.531 0.038  623 280    2.5   1 Dhi2015  Es
0000004+054750  AB      2008.8151      .      .        .       .       18.844 0.017  19.688 0.033  762 300    2.5   1 Dhi2015  Es
0000004+054750  AB      2008.8151      .      .        .       .       18.447 0.037  19.120 0.065  913 240    2.5   1 Dhi2015  Es
0000010+151505 A        1998   2 211   4.13  20.09g 14.63  M1         .       .       .   SLW 0000+1515             V 000001.06+151505.1
0000010+151505 B        2000     212   4.08  16.54g 13.46  K2    +0031.  +0018.       .   2MASS J00000091+1515015      000000.92+151501.7
0000010+151505  AB      1998.883    211.0      .       4.126     .       14.524  .    13.979  .    1256 245    1.3   1 TMA2003  E2
0000010+151505  AB      1998.883       .      .        .       .       14.923 0.035 1633 160    1.3   1 TMA2003  E2
0000010+151505  AB      1998.883       .      .        .       .       14.627 0.093  13.456 0.046 2210 300    1.3   1 TMA2003  E2
0000010+151505  AB      2000.7388   212.      .       4.08     .       22.554 0.255  18.720 0.018  355 120    2.5   1 Dhi2015  Es
0000010+151505  AB      2000.7388      .      .        .       .       20.092 0.017  16.539 0.004  477 280    2.5   1 Dhi2015  Es
0000010+151505  AB      2000.7388      .      .        .       .       18.271 0.008  15.635 0.005  623 280    2.5   1 Dhi2015  Es
0000010+151505  AB      2000.7388      .      .        .       .       17.410 0.007  15.314 0.005  762 300    2.5   1 Dhi2015  Es
0000010+151505  AB      2000.7388      .      .        .       .       16.952 0.013  15.147 0.006  913 240    2.5   1 Dhi2015  Es
0003431-075506 A        2009   1  61   9.67  21.21g 15.21  M2         .       .       .   SLW 0003-0755             V 000343.16-075506.1
0003431-075506 B        2009      61   9.67  21.48g 15.83  M2         .       .       .   2MASS J00034378-0755014      000343.74-075501.5
0003431-075506  AB      2009.7897    61.      .       9.67     .       22.374 0.457  22.927 0.731  355 120    2.5   1 Dhi2015  Es
0003431-075506  AB      2009.7897      .      .        .       .       21.206 0.048  21.480 0.061  477 280    2.5   1 Dhi2015  Es
0003431-075506  AB      2009.7897      .      .        .       .       19.865 0.024  20.040 0.027  623 280    2.5   1 Dhi2015  Es
0003431-075506  AB      2009.7897      .      .        .       .       18.648 0.013  18.829 0.014  762 300    2.5   1 Dhi2015  Es
0003431-075506  AB      2009.7897      .      .        .       .       18.092 0.028  18.207 0.031  913 240    2.5   1 Dhi2015  Es
0003431-075506 A        2009   1  92  10.08  21.21g 15.21  M2         .       .       .   SLW 0003-0755             V 000343.16-075506.1
0003431-075506 C        2009      92  10.08  21.52g 15.56  M2         .       .       .   2MASS J00034383-0755065      000343.84-075506.4
0003431-075506  AC      2009.7897    92.      .      10.08     .       22.374 0.457  26.031 0.908  355 120    2.5   1 Dhi2015  Es
0003431-075506  AC      2009.7897      .      .        .       .       21.206 0.048  21.521 0.063  477 280    2.5   1 Dhi2015  Es
0003431-075506  AC      2009.7897      .      .        .       .       19.865 0.024  19.862 0.024  623 280    2.5   1 Dhi2015  Es
0003431-075506  AC      2009.7897      .      .        .       .       18.648 0.013  18.667 0.013  762 300    2.5   1 Dhi2015  Es
0003431-075506  AC      2009.7897      .      .        .       .       18.092 0.028  18.106 0.028  913 240    2.5   1 Dhi2015  Es
0003431-075506 B        2009   1 163   5.16  21.48g 15.83  M2         .       .       .   2MASS J00034378-0755014      000343.74-075501.5
0003431-075506 C        2009     163   5.16  21.52g 15.56  M2         .       .       .   2MASS J00034383-0755065      000343.84-075506.4
0003431-075506  BC      2009.7897   163.      .       5.16     .       22.927 0.731  26.031 0.908  355 120    2.5   1 Dhi2015  Es
0003431-075506  BC      2009.7897      .      .        .       .       21.480 0.061  21.521 0.063  477 280    2.5   1 Dhi2015  Es
0003431-075506  BC      2009.7897      .      .        .       .       20.040 0.027  19.862 0.024  623 280    2.5   1 Dhi2015  Es
0003431-075506  BC      2009.7897      .      .        .       .       18.829 0.014  18.667 0.013  762 300    2.5   1 Dhi2015  Es
0003431-075506  BC      2009.7897      .      .        .       .       18.207 0.031  18.106 0.028  913 240    2.5   1 Dhi2015  Es
```

The database is presently divided into 4 six-hour RA bands (wdss1.dat, ... wdss4.dat). It will undoubtedly have to be further divided into smaller bands (as in the WDS) as it grows in size. A summary file (wdss_summ.txt) is also available.

See the main WDS page `http://ad.usno.navy.mil/wds/wds.html` or mirror `http://www.astro.gsu.edu/wds/` for files.

Brian D. Mason & William I. Hartkopf

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The deadline for contributions to Information Circular No. 193 is:

October 15th 2017

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