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ORBITS, MASSES AND DYNAMICAL PARALLAXES OF 12 VISUAL BINARY SYSTEMS

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SUMMARY: In this paper the preliminary orbital elements are presented for the folowing double stars: WDS 00153+4412 = A 1256 AB, WDS 00470+2315 = HU 413, WDS 00520+3154 = A 924, WDS 01036+6341 = MLR 87, WDS 01131+2942 = A 1260, WDS 01158+0947 = A 2102, WDS 01200-1549 = HJ 2036, WDS 02423+4925 = HU 539, WDS 02512+0141 = A 2338, WDS 02514-2139 = DON 43, WDS 06253+0130 = FIN 343, WDS 20329+1142 = J 1. For all pairs in addition to the orbital elements, the dynamical parallaxes, the masses, the absolute magnitudes, the observations, the residuals (O-C) and the ephemerides for the next six years are given.

Key words. binaries: visual – stellar dynamics

1. INTRODUCTION

The fact that in performing the observations of double and multiple stars telescopes are used with ever increasing apertures, new equipment and techniques, improving the quality of observations, enables one to calculate and recalculate orbital elements for a considerable number of binaries. The data communicated here for 12 double stars, calculated by using the Fifth Catalog of Orbits of Visual Binary Stars (Hartkopf et al. 2002) and Information Circulars of IAU Commission 26 up to No 146, represent the first attempt at their determination. In addition to the orbital elements (Keplerian) the absolute magnitudes are also presented, masses of the components and orbital parallaxes (Angelov 1993), for the pairs without a reliable position on HR diagram. For comparison the Hipparcos parallaxes are also given.

2. RESULTS AND COMMENTS

2.1. Results

The results of the calculations are given in Tables 1, 2 and 3 and in Fig. 1.

Table 1 contains Keplerian orbital elements with the errors, absolute magnitudes, dynamical masses and parallaxes, as well as Hipparcos parallaxes, if existing, given for comparison.

Table 2 contains the observations and residuals.

In Table 3 the ephemerides are given for the forthcoming period of 6 years as an aid to observers and also for more rapid error detecting in the calculated elements.

Figures give the shapes of orbits, the corresponding observations, as well as the positions calculated on a computed orbit and nodal line.

2.2. Comments

WDS 00153+4412 = A 1256AB: The measurements for this system, though discordant, define the orbit shape well.

WDS 00470+2315 = HU 413: The measurements cover about 1/3 of the orbit.

WDS 00520+3154 = A 924: The published observations cover just over half a revolution since it was first resolved by Aitken in 1905.

WDS 01036+6341 = MLR 87: The B component approaches the periastron and in the forthcoming period it will be difficult for measuring.

WDS 01131+2942 = A 1260: The measurements cover about 160 degrees of the orbit. During the next three decades it will be very difficult to measure this pair.

WDS 01158+0947 = A 2102: The orbit shape explains the main cause of a big gap in the measurements between 1919 and 1958.

WDS 01200−1549 = HJ 2036: Long-period ? $\pi_{dyn} = \pi_{hip}$.

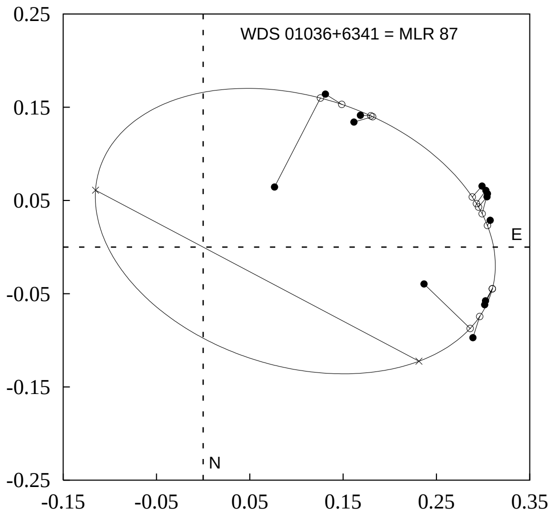
WDS 02423+4925 = HU 539: In the next decade it will be difficult for measuring.

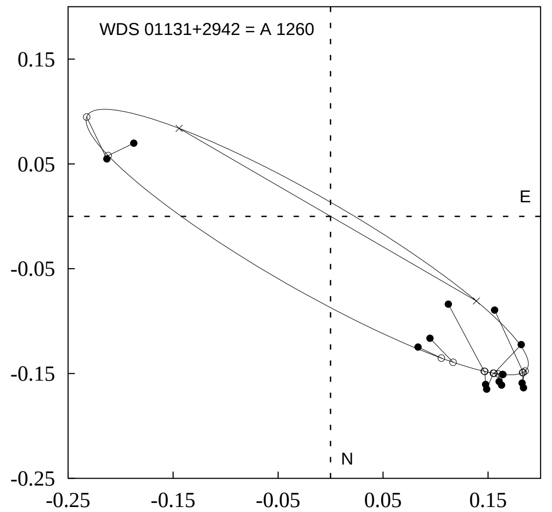
WDS 02512+0141 = A 2338: The pair has been observed only over two distant parts (angular separation about 180 ^{0}) of the orbit.

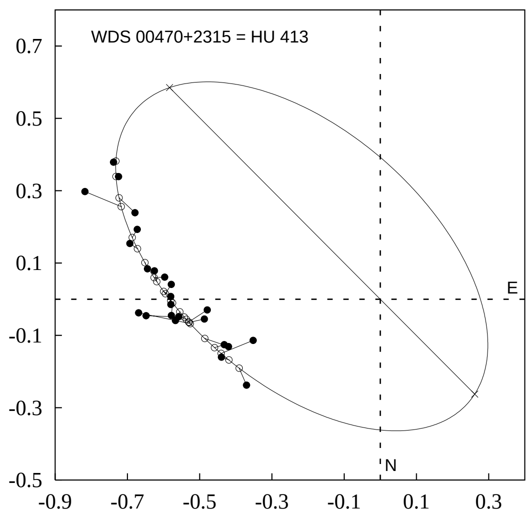
WDS 02514−2139 = DON 43: Although the number of measurements is small, their convenient distribution allows the orbit calculation.

WDS 06253+0130 = FIN 343: The measurements cover some 110 degrees of the orbit and define the ellipse quite well. The quadrants for 1991.25 and 1993.0951 are adjusted to conform to the other measurements.

WDS 20329+1142 = J 1: The obtained orbital elements fit the measurements well. The pair is very convenient for observations.







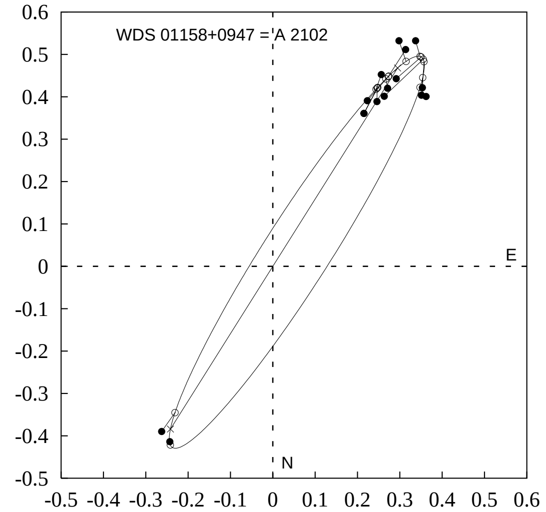


Fig. 1. *Orbits of 12 visual binary stars. Coordinates are given in arcseconds.*

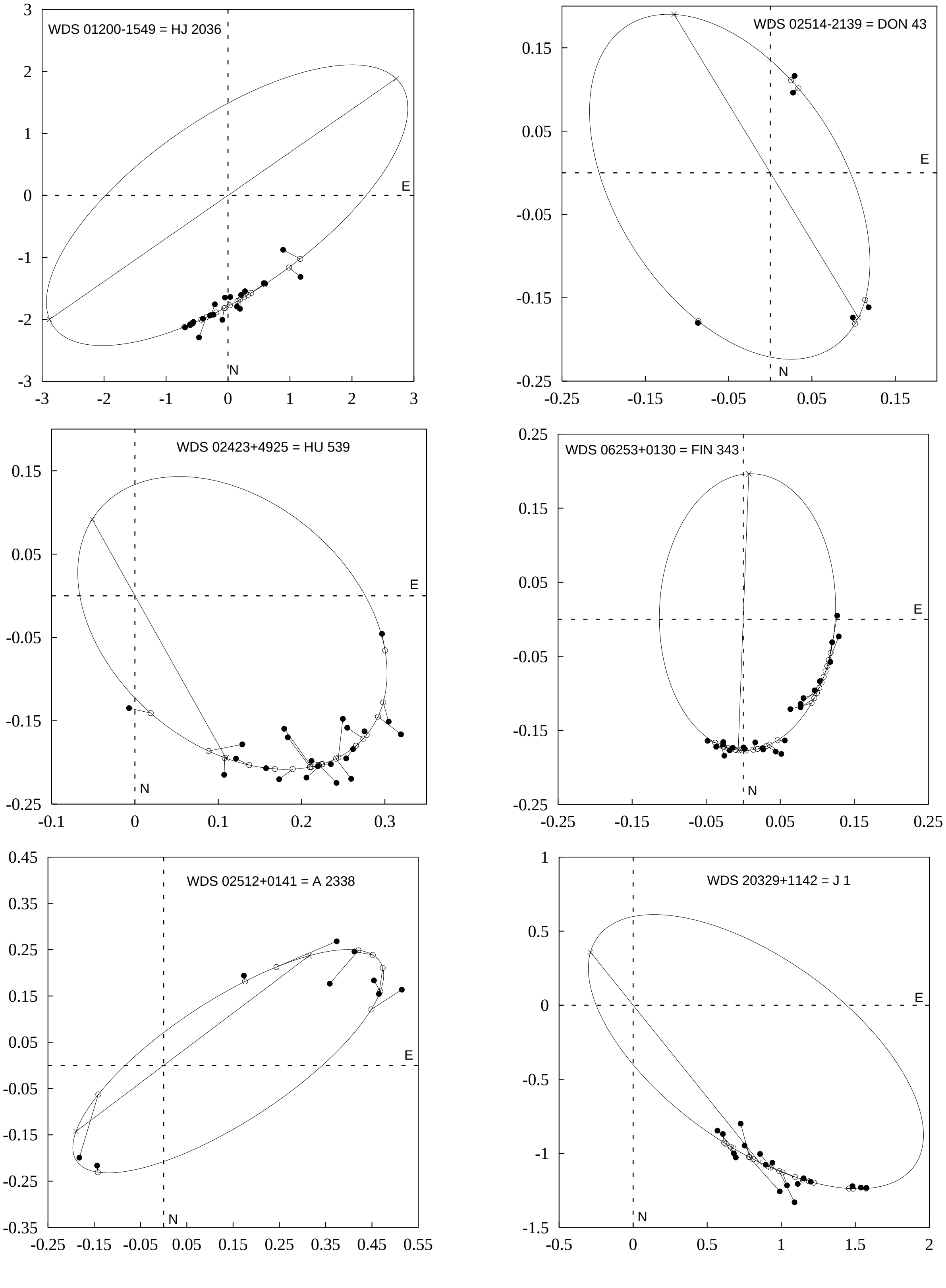


Fig. 1. *Orbits of 12 visual binary stars (continued). Coordinates are given in arcseconds.*

Table 1. Orbital elements, absolute magnitudes, masses and parallaxes

Name	A 1256 AB	HU 413	A 924	MLR 87	A 1260	A 2102
WDS	00153+4412	00470+2315	00520+3154	01036+6341	01131+2942	01158+0947
ADS	197	650	705	–	993	1016
HIP	1233	3637	–	4963	–	5898
m	7.30-7.50	8.47-9.87	9.80-9.90	8.14-8.97	9.60-9.80	7.16-9.68
Sp.	B9IV	G5	F8	G0	G0	F4V
$P(yr)$	137.958	351.370	165.695	56.926	125.375	186.465
	±1.657	± 9.704	±3.248	±6.510	±10.489	±3.732
T	1997.78	2074.213	1987.03	2011.834	2013.12	1934.609
	±0.12	± 6.372	±2.91	±6.893	± 7.435	±0.302
$a('')$	0.1527	0.6232	0.2744	0.2370	0.3568	0.5921
	±0.0008	±0.0481	±0.0727	±0.2885	±0.0493	±0.1115
e	0.7238	0.4235	0.6393	0.5150	0.7357	0.3975
	±0.0096	±0.0532	±0.0170	±0.3214	±0.	±0.0248
$i(^o)$	62.9	52.5	153.90	131.4	82.9	97.63
	±0.3	±2.8	±9.48	±134.1	±3.4	±1.47
$\Omega(^o)$	68.4	44.9	55.23	62.1	59.8	147.80
	±1.0	± 3.2	±4.34	±63.3	±15.0	±0.21
$\omega(^o)$	118.14	25.9	335.05	130.5	88.5	255.65
	±0.02	±10.0	±3.74	±35.8	±3.3	±3.42
$M_A(mag)$	−0.26	3.29	5.18	3.49	4.81	2.77
$M_B(mag)$	−0.06	4.69	5.28	4.32	5.01	5.29
$\mathcal{M}_A(\odot)$	3.34	1.40	1.04	1.35	1.10	1.54
$\mathcal{M}_B(\odot)$	3.13	1.12	1.03	1.18	1.07	1.02
$\pi('')$	0.0031	0.0092	0.0119	0.0118	0.0110	0.0133
$\pi_{HIP}('')$	0.0040	0.0079	–	0.0097	–	0.0177

Name	HJ 2036	HU 539	A 2338	DON 43	FIN 343	J 1
WDS	01200-1549	02423+4925	02512+0141	02514-2139	06253+0130	20329+1142
ADS	1087	2051	2177	–	–	–
HIP	6234	12632	–	–	30547	–
m	6.70-6.98	8.50-8.80	9.9-10.6	9.50-9.70	6.66-7.47	10.04-11.57
Sp.	G0IV	F5	F5	F3V	B9V	G0
$P(yr)$	1443.343	205.145	162.096	113.723	136.191	528.391
	± 37.617	±14.344	±20.169	± 0.787	± 5.323	±34.998
T	2674.911	2010.418	1975.489	1970.53	2001.034	2396.217
	±18.428	±3.433	±4.332	± 0.711	± 4.717	±5.49
$a('')$	3.4307	0.2375	0.4712	0.2462	0.1871	1.5446
	±0.2653	±0.0076	±0.0704	± 0.0097	± 0.0046	±0.1719
e	0.0922	0.6312	0.6097	0.3699	0.0692	0.7450
	±0.0244	±0.0381	±0.0218	±0.0303	±0.0144	±0.1554
$i(^o)$	114.06	134.42	73.0	56.2	129.5	58.5
	± 2.9	±0.24	±1.0	± 1.6	± 0.9	± 3.5
$\Omega(^o)$	124.78	29.27	127.0	31.3	177.8	38.8
	± 1.6	±2.27	±4.3	± 1.8	± 1.0	± 5.3
$\omega(^o)$	288.88	124.83	114.0	83.1	220.5	228.4
	±24.5	±0.23	±4.4	± 6.6	± 7.3	± 10.4
$M_A(mag)$	3.09	1.72	5.54	3.95	−0.41	6.60
$M_B(mag)$	3.37	2.02	6.24	4.15	0.40	8.13
$\mathcal{M}_A(\odot)$	1.45	1.92	0.87	1.25	3.52	0.85
$\mathcal{M}_B(\odot)$	1.38	1.79	0.77	1.21	2.71	0.68
$\pi('')$	0.0190	0.0044	0.0134	0.0078	0.0039	0.0205
$\pi_{HIP}('')$	0.01967	0.0022	–	–	0.0027	–

Table 2. Observations and residuals

WDS 00153+4412 = A 1256 AB

t	$\theta°$	ρ''	n	Obs.	$\Delta\theta°$	$\Delta\rho''$
1906.78	4.0	0.13	3	A	−3.2	0.007
1908.95	11.2	0.12	1	A	1.4	−0.008
1914.52	16.9	0.15	1	A	1.0	0.012
1918.63	19.8	0.15	2	A	0.0	0.004
1921.66	20.0	0.16	6	A	−2.4	0.008
1933.73	32.3	0.16	2	A	1.0	−0.010
1943.77	37.1	0.16	3	VBs	−0.5	−0.020
1945.685	42.2	0.15	–	Jeff	3.5	−0.031
1951.780	40.9	0.23	1	Mrz	−1.3	0.046
1952.820	42.3	0.19	1	Mrz	−0.5	0.006
1953.69	42.3	0.17	3	Mul	−1.0	−0.014
1956.61	42.1	0.17	6	VBs	−2.8	−0.014
1961.79	45.5	0.16	3	Cou	−2.4	−0.021
1961.954	55.8	0.17	4	Bos	7.8	−0.011
1962.682	45.2	0.15	4	Wor	−3.2	−0.030
1965.81	52.3	0.22	1	Mul	2.0	0.043
1968.90	56.4	0.16	4	Cou	4.2	−0.013
1970.45	52.0	0.17	3	Cou	−1.2	0.000
1971.377	58.3	0.15	4	Wor	4.5	−0.018
1972.	–	–	1	hz	–	–
1976.6167	56.8	0.161	1	Int4	−0.9	0.006
1976.6194	58.3	0.175	1	Int4	0.6	0.020
1976.6221	59.1	0.148	1	Int4	1.4	−0.007
1976.8597	55.9	0.151	1	Int4	−2.0	−0.003
1976.9225	56.8	0.149	1	Int4	−1.1	−0.005
1977.6350	62.4	0.148	1	Int4	3.9	−0.004
1977.7334	57.1	0.145	1	Int4	−1.5	−0.007
1977.9163	54.3	0.135	1	Int4	−4.4	−0.016
1977.9192	56.4	0.132	1	Int4	−2.3	−0.019
1978.6180	58.5	0.144	1	Int4	−0.8	−0.005
1980.7177	59.5	0.154	1	Int4	−1.7	0.013
1980.8870	61.0	0.150	1	Int4	−0.4	0.010
1982.5088	61.8	0.138	1	Int4	−1.3	0.005
1982.6809	65.8	0.155	1	Int4	2.5	0.023
1983.7104	66.2	0.129	1	Int4	1.8	0.002
1983.9361	74.0	0.132	1	Int4	9.3	0.006
1984.7015	64.8	0.116	1	Int4	−0.9	−0.006
1984.9991	61.6	0.117	1	Int4	−4.4	−0.003
1985.8401	67.1	0.111	1	Int4	−0.1	−0.004
1985.8455	67.2	0.111	1	Int4	−0.0	−0.004
1986.8859	68.8	0.105	1	Int4	−0.0	−0.004
1987.7622	69.7	0.098	1	Int4	−0.6	−0.005
1988.6552	72.6	0.093	1	Int4	0.5	−0.003
1991.9016	78.0	0.068	1	Int4	−3.5	0.001

WDS 00470+2315 = HU 413

t	$\theta°$	ρ''	n	Obs.	$\Delta\theta°$	$\Delta\rho''$
1901.90	242.7	0.83	3	Hu	−0.2	0.004
1910.0	244.8	0.80	7	Doo..	−0.8	−0.007
1920.56	250.5	0.72	4	VBs..	1.3	−0.056
1924.71	249.9	0.87	7	Geb..	−0.8	0.108
1938.71	253.9	0.70	4	Bz	−2.4	−0.008
1943.60	257.4	0.71	3	Vou	−1.1	0.023
1949.62	262.5	0.65	2	VBs	1.1	−0.009
1955.98	264.1	0.60	3	Cou	−0.6	−0.029
1957.69	262.8	0.63	3	Wor	−2.9	0.009
1961.84	269.2	0.58	3	Cou	1.1	−0.020
1962.79	265.9	0.58	3	hz	−2.8	−0.015
1965.77	271.4	0.58	4	hz	0.9	0.000
1966.724	274.4	0.58	1	Cou	3.2	0.005
1970.43	275.9	0.57	3	Cou	2.2	0.014
1972.646	274.0	0.65	4	Wor	−1.3	0.105
1973.607	274.9	0.56	4	Wor	−1.1	0.020
1974.726	273.5	0.48	3	Wor	−3.3	−0.054
1974.908	276.4	0.49	4	Wor	−0.6	−0.043
1975.43	273.2	0.67	4	Mul	−4.2	0.140
1981.78	287.3	0.44	3	hz	4.7	−0.058
1985.76	286.2	0.45	2	Cou	−0.1	−0.028
1988.317	287.9	0.37	4	Wor	−0.9	−0.095
1991.25	290	0.468	1	HIP	−1.8	0.017
1994.98	302.7	0.44	2	hz	6.7	0.006

WDS 00520+3154 = A 924

t	$\theta°$	ρ''	n	Obs.	$\Delta\theta°$	$\Delta\rho''$
1905.89	254.2	0.44	3	A	−2.6	−0.003
1918.78	250.1	0.44	2	A	0.8	0.003
1944.64	237.3	0.36	3	Vou	5.4	−0.009
1944.79	237.2	0.45	3	VBs	5.4	−0.081
1958.019	222.0	0.34	2	Bos	3.6	0.041
1958.650	230.3	0.28	1	VBs	12.7	−0.015
1958.657	223.8	0.22	3	Bos	6.2	−0.075
1964.85	208.3	0.22	2	Cou	0.1	−0.032
1967.79	22.9	0.20	2	Cou	0.4	−0.029
1970.65	16 :	0.20	4	Cou	0.4	−0.005
1978.72	161.3	0.17	3	hz	−0.6	0.038
1994.7085	2.4	0.136	2	Har	−4.5	0.004
1905.9208	355.0	0.153	1	Har	−4.5	0.013
1996.6909	351.1	0.143	1	Har	−4.2	−0.002

WDS 01036+6341 = MLR 87

t	$\theta°$	ρ''	n	Obs.	$\Delta\theta°$	$\Delta\rho''$
1970.59	130	0.10	1	Mlr	−11.7	−0.033
1970.71	-	0.17	1	Mlr	–	–
1971.88	141.3	0.21	2	Cou	5.6	−0.003
1973.76	309.9	0.22	1	Cou	1.9	−0.008
1973.88	129.6	0.21	3	hz	2.1	−0.019
1983.0690	102.3	0.306	1	McA	1.8	0.013
1983.7104	101.3	0.309	1	McA	2.3	0.012
1984.0547	100.0	0.309	1	McA	1.8	0.011
1984.7015	100.6	0.310	1	McA	3.8	0.009
1985.8402	95.3	0.309	1	McA	1.0	0.003
1991.8934	79.2	0.308	1	Hrt	−2.6	−0.005
1991.9043	78.4	0.308	1	Hrt	−3.3	−0.005
1994.7084	71.4	0.305	1	Hrt..	−4.5	−0.001
1996.01	80.5	0.24	2	Hrt..	7.5	−0.059

Table 2. Observations and residuals (continued)

WDS 01131+2942 = A 1260

t	$\theta°$	ρ''	n	Obs.	$\Delta\theta°$	$\Delta\rho''$
1905.95	255.4	0.22	2	A	7.8	−0.031
1918.78	249.4	0.20	2	A	−5.1	−0.020
1945.910	264.6	0.19	1	VBs	−33.1	0.100
1948.777	-	0.1	1	VBs	–	–
1951.042	-	0.1	1	VBs	–	–
1976.810	33.7	0.15	1	Cou	−4.3	−0.022
1978.85	39.1	0.15	3	hz	−.9	−0.032
1984.73	53.2	0.14	3	hz	8.5	−0.068
1984.8483	42.6	0.218	1	Bag	−2.2	0.009
1986.6570	42.0	0.222	1	Bag	−4.0	0.006
1986.6600	47.4	0.223	1	Bag	1.4	0.007
1986.81	56.0	0.219	2	Cou	9.9	0.003
1987.7568	45.5	0.225	1	McA	−1.2	0.006
1988.6635	45.3	0.229	1	McA	−2.0	0.007
1994.7085	48.3	0.246	1	Hart	−2.5	0.010
1994.99	60.2	0.18	2	hz	9.2	−0.056
1995.9318	48.9	0.242	1	Hart	−2.6	0.005

WDS 01158+0947 = A 2102

t	$\theta°$	ρ''	n	Obs.	$\Delta\theta°$	$\Delta\rho''$
1909.860	329.4	.48	2	A	−0.2	−0.006
1919.830	325.9	.47	3	A	0.1	0.055
1958.300	150.4	.52	2	VBs	0.9	0.036
1958.583	147.6	.46	4	Bos	−1.8	−0.028
1958.695	149.1	.42	3	Bos	−0.3	−0.069
1958.723	149.1	.42	3	Bos	−0.3	−0.069
1960.930	147.1	.50	3	Bos	−1.6	−0.017
1961.643	148.4	.60	4	Bos	−0.0	0.076
1961.768	150.2	.45	4	Wor	1.8	−0.076
1967.970	150.7	.61	2	Cou	3.9	0.033
1976.669	147.6	.63	2	Wolk	2.7	0.025
1977.900	146.6	.53	3	hz	2.1	−0.076
1980.890	146.7	.48	3	Wor	2.8	−0.124
1982.840	140.0	.55	2	hz	−3.4	−0.051
1991.25	139.0	.535	1	Hip	−2.5	−0.034
1994.970	137.9	.54	2	hz	−2.6	−0.007

WDS 01200-1549 = HJ 2036

t	$\theta°$	ρ''	n	Obs.	$\Delta\theta°$	$\Delta\rho''$
1835.72	45.0	1.25	1	h	−3.3	−0.301
1852.50	41.4	1.76	3	TM	1.5	0.237
1886.98	21.9	1.53	1	Gnd	−0.4	−0.022
1906.22	12.6	1.54	12	ADS	9.4	−0.078
1910.61	9.9	1.57	18	ADS	−1.3	−0.067
1916.19	7.3	1.62	10	ADS	−1.5	−0.043
1921.30	5.9	1.84	2	VBs	−0.7	0.151
1925.38	4.5	1.80	10	ADS	−0.5	0.088
1935.948	1.1	1.64	4	Bos	0.3	−0.133
1942.58	358.2	1.65	3	Vou	−0.2	−0.165
1943.73	357.3	2.01	3	AA	−0.7	0.187
1954.86	353.0	1.94	2	Chu.	−1.2	0.042
1961.582	351.4	1.96	4	Bos	−0.6	0.015
1961.835	353.0	1.77	1	Mour	1.1	−0.177
1968.71	348.4	2.34	4	Mour	−1.4	0.343
1975.733	348.4	2.03	3	Wor	0.6	−0.020
1987.585	344.70	2.118	1	AA	0.1	−0.022
1988.631	343.72	2.181	1	AA	−0.6	0.033
1989.663	344.22	2.143	1	Bz	0.1	−0.013
1991.7129	343.8	2.171	1	Har..	0.2	−0.001
1999.8530	342.0	2.24	2	Mas..	0.4	0.004

WDS 02423+4925 = HU 593

t	$\theta°$	ρ''	n	Obs.	$\Delta\theta°$	$\Delta\rho''$
1902.00	80.7	0.30	3	Hu	3.7	−0.007
1922.48	63.2	0.34	4	A,VBs	−3.0	0.016
1928.735	62.1	0.36	1	VBs	−1.0	0.034
1937.666	59.1	0.32	1	VBs	0.5	−0.004
1939.730	57.8	0.30	1	VBs	0.3	−0.023
1943.789	54.6	0.32	1	VBs	−0.9	−0.001
1943.792	52.1	0.32	1	VBS	−3.4	−0.001
1944.70	311.3	0.25e	2	Vou	er.	–
1951.917	59.1	0.29	1	Mrz	7.9	−0.022
1952.878	49.5	0.34	1	Mrz	−1.2	0.029
1958.006	43.1	0.30	1	VBs	−4.7	−0.002
1958.082	49.1	0.31	1	Bos	1.4	0.008
1958.093	46.7	0.29	1	Bos	−1.0	−0.012
1959.14	46.9	0.33	2	Cou	−0.2	0.030
1961.51	48.1	0.24	6	hz	2.4	−0.055
1961.996	47.0	0.25	3	Bos	1.6	−0.044
1962.00	46.8	0.30	4	VBs	1.4	0.006
1967.11	38.0	0.28	3	hz	−4.1	−0.001
1971.85	37.1	0.26	4	hz	−1.6	−0.007
1977.85	31.7	0.23	3	hz	−2.2	−0.015
1982.95	26.4	0.24	2	Cou	−2.5	0.018
1986.060	35.8	0.22	2	Wor	10.5	0.014
1995.9209	357.0	0.135	1	Hrt	−7.6	−0.007

WDS 02512+0141 = A 2338

t	$\theta°$	ρ''	n	Obs.	$\Delta\theta°$	$\Delta\rho''$
1911.73	107.3	0.54	2	A	1.9	0.075
1919.33	111.7	0.49	2	A	2.5	−0.005
1930.98	108.1	0.49	1	A	−6.2	−0.028
1939.975	120.6	0.48	4	Bos	2.5	−0.031
1946	116.0	0.4	2	ADS	−4.8	−0.089
1961.777	125.5	0.46	4	Bos	−5.7	0.137
1965.257	138.1	0.26	2	Wor	2.1	0.007
1977.95	317.5	0.27	3	hz	23.5	0.115
1996.04	326.4	0.26	2	hz	−1.9	−0.011

WDS 02514-2139 = DON 43

t	$\theta°$	ρ''	n	Obs.	$\Delta\theta°$	$\Delta\rho''$
1930	334	0.2	1	Don	0.1	.002
1956.02	389.5	0.20	1	Bos	0.3	−.008
1959	396	0.2	1	Bos	−0.7	.010
1975	534	0.1	1	Wor	2.4	−.007
1975.704	165.8	0.12	1	* Wor	−1.5	.006
1975.745	126.2	0.12	1	* Wor	–	–

Table 2. Observations and residuals (continued)

WDS 06253+0130 = FIN 343

t	$\theta°$	ρ''	n	Obs.	$\Delta\theta°$	$\Delta\rho''$
1959	92	0.127	2	Int4	23.3	0.000
1960.22	75.3	0.124	7	Int4	11.0	−0.004
1961.23	79.6	0.131	1	Int4	18.9	0.001
1962.19	63.7	0.131	1	Int4	6.2	−0.001
1963.206	50.8	0.133	1	Int4	−3.3	−0.001
1964.190	44.9	0.136	1	Int4	−6.0	0.000
1965.200	34.0	0.138	1	Int4	−13.7	0.000
1966.192	37.2	0.134	1	Int4	−7.6	−0.007
1967.198	32.9	0.142	1	Int4	−8.9	−0.002
1968.222	27.5	0.137	1	Int4	−11.5	−0.009
1978.1464	18.8	0.173	1	Int4	3.0	0.003
1980.1588	15.7	0.189	1	Int4	3.9	0.016
1980.8877	13.7	0.184	1	Int4	3.3	0.010
1983.0121	8.7	0.178	1	Int4	2.4	0.002
1983.0475	8.5	0.176	1	Int4	2.3	0.000
1984.0579	5.5	0.167	1	Int4	1.2	−0.010
1985.8381	0.6	0.175	1	Int4	−0.4	−0.002
1987.2744	0.1	0.173	1	Int4	1.8	−0.004
1988.1675	355.3	0.174	1	Int4	−1.4	−0.003
1989.2377	354.0	0.178	1	Int4	−0.6	0.002
1989.9442	350.8	0.171	1	Int4	−2.5	−0.004
1990.9164	350.7	0.168	1	Int4	−0.7	−0.006
1991.25	168.	0.176	1	Int4	−2.8	0.002
1991.7189	352.1	0.186	1	Int4	2.2	0.013
1993.0951	163.6	0.171	1	Int4	−3.6	0.000

WDS 20329+1142 = J 1

t	$\theta°$	ρ''	n	Obs.	$\Delta\theta°$	$\Delta\rho''$
1910.25	35.3	1.06	4	J	1.3	−0.053
1910.81	34.4	1.24	2	V	0.2	0.116
1912.69	34.6	1.21	2	J	−0.4	0.050
1913.81	34.3	1.02	4	Doo	−1.2	−0.160
1920.04	38.6	1.60	2	Ol	0.8	0.311
1920.36	42.6	1.08	4	J	4.7	−0.214
1921.85	38.8	1.21	3	V	0.4	−0.108
1928.73	41.8	1.42	2	Fur	1.4	−0.002
1929.73	40.8	1.32	1	Gia	0.1	−0.116
1933.79	39.6	1.72	2	Ol	−2.1	0.228
1935.46	40.8	1.60	3	Bz	−1.4	0.086
1941.94	40.0	1.40	1	J	−3.6	−0.194
1946.27	42.9	1.64	3	J	−1.7	−0.003
1949.63	45.4	1.69	3	J	0.2	0.011
1952.66	44.8	1.64	3	C	−1.0	−0.070
1976.707	50.6	1.92	3	Wor	0.7	0.008
1979.823	51.4	1.97	3	Wor	1.1	0.037
1991.000	52	2.0	3	Hip	0.0	0.091

Table 3. Ephemerides

WDS	00153+4412		00470+2315		00520+3154	
t	$\theta°$	ρ''	$\theta°$	ρ''	$\theta°$	ρ''
2003.0	259.6	0.064	306.0	0.402	328.4	0.190
2004.0	264.1	0.067	307.4	0.398	325.3	0.197
2005.0	268.1	0.069	308.8	0.395	322.5	0.204
2006.0	272.0	0.071	310.2	0.391	319.9	0.211
2007.0	275.7	0.072	311.7	0.388	317.4	0.218
2008.0	279.3	0.073	313.1	0.385	315.1	0.225

WDS	01036+6341		01131+2942		01158+0947	
t	$\theta°$	ρ''	$\theta°$	ρ''	$\theta°$	ρ''
2003.0	53.0	0.223	55.5	0.222	138.0	0.487
2004.0	48.6	0.205	56.1	0.215	137.7	0.478
2005.0	43.3	0.186	56.8	0.207	137.3	0.470
2006.0	36.7	0.164	57.5	0.196	136.9	0.461
2007.0	27.9	0.140	58.4	0.184	136.6	0.452
2008.0	15.6	0.117	59.4	0.168	136.1	0.442

WDS	01200−1549		02423+4925		02512+0141	
t	$\theta°$	ρ''	$\theta°$	ρ''	$\theta°$	ρ''
2003.0	340.8	2.261	336.5	0.086	340.3	0.243
2004.0	340.6	2.269	328.6	0.079	342.3	0.238
2005.0	340.4	2.277	319.3	0.073	344.3	0.234
2006.0	340.1	2.284	308.4	0.068	346.5	0.229
2007.0	339.9	2.292	296.3	0.065	348.7	0.225
2008.0	339.7	2.300	283.5	0.065	351.0	0.221

WDS	02514−2139		06253+0130		20329+1142	
t	$\theta°$	ρ''	$\theta°$	ρ''	$\theta°$	ρ''
2003.0	237.2	0.246	324.0	0.144	53.5	2.059
2004.0	238.9	0.244	321.1	0.141	53.7	2.064
2005.0	240.6	0.242	318.1	0.138	53.8	2.068
2006.0	242.3	0.241	314.9	0.135	53.9	2.072
2007.0	244.0	0.239	311.6	0.131	54.0	2.076
2008.0	245.8	0.236	308.1	0.128	54.2	2.080

3. CONCLUSION

The small residuals (O-C), as well as relatively small formal errors $(P, T, a, e, i, \Omega, \omega)$ for all the systems analysed in the present paper, confirm that the calculated orbital elements can be adopted as preliminary ones.

Besides, with regard to the good agreement between $\pi(dyn)$ and $\pi(hip)$ for the systems from the Hipparcos Programme, the above conclusion is confirmed at least as far as the ratio a''^3/P^2 is concerned.

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ОРБИТЕ, МАСЕ И ДИНАМИЧКЕ ПАРАЛАКСЕ ЗА 12 ВИЗУЕЛНО ДВОЈНИХ СИСТЕМА

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UDK 521.3
Оригинални научни рад

У овом раду представљени су прелиминарни орбитални елементи за следеће двојне звезде: WDS 00153+4412 = A 1256 AB, WDS 00470+2315 = HU 413, WDS 00520+3154 = A 924, WDS 01036+6341 = MLR 87, WDS 01131+2942 = A 1260, WDS 01158+0947 = A 2102, WDS 01200-1549 = HJ 2036, WDS 02423+4925 = HU 539, WDS 02512+0141 = A 2338, WDS 02514-2139 = DON 43, WDS 06253+0130 = FIN 343, WDS 20329+1142 = J 1. За сваки пар дати су поред орбиталних елемената, динамичка паралакса, масе, апсолутне магнитуде, посматрања, одступања (O-C) и ефемериде за следећих шест година.