

RECALCULATION OF 5 DOUBLE STARS ORBITS

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SUMMARY: In this paper are presented orbital elements and corresponding astrophysical quantities for the pairs: WDS 00057+4549 = ADS 48, WDS 00576+5424 = ADS 795, WDS 08017-0836 = ADS 6526, WDS 21044-1951 = FIN 328 and WDS 23529-0309 = FIN 359.

1. INTRODUCTION

Periods of the pairs: $WDS\ 00057+4549 = ADS\ 48$, $WDS\ 00576+5424 = ADS\ 795$ and $WDS\ 08017-0836 = ADS\ 6526$ which are published in BAOB No. 153 (1996.) and in CIUAI No. 130 (Popović and Živkov, 1996) are $1550.64y$, $299.74y$ and $495.73y$, respectively. Recalculation is done for the same observations in order to find orbits with shorter periods that also fit the observations well. For the pair $WDS\ 21044-1951 = FIN\ 328$ Zulević used observations until 1985.4902 (Zulević, 1993). Our latest observation is from 1992.4498. The first observation from IDS catalogue has not been taken into account because of problematic quality. And finally, for the pair $WDS\ 23529-0309 = FIN\ 359$ Couteau's (1989) last observation was from 1987.7622 and ours from 1994.7029.

2. RESULTS

Orbital elements and corresponding astrophysical quantities are presented in Table 1. Table 2. includes the observations and corresponding residuals O - C. Ephemeris of the first three pairs are presented in Table 3a, and of the other pairs in Table 3b. The orbits of analysed pairs are graphically presented in Figures 1. - 5.

3. CONCLUSION

Orbital elements of the pairs: $WDS\ 00057+4549 = ADS\ 48$, $WDS\ 00576+5424 = ADS\ 795$ and $WDS\ 08017-0836 = ADS\ 6526$ can be accepted with reservation because there are great differences in periods for the same observational data. Orbital elements of the pairs: $WDS\ 21044-1951 = FIN\ 328$ and $WDS\ 23529-0309 = FIN\ 359$ can be accepted as definitive because the pairs were observed during time approximately equal to their periods. For the pair $WDS\ 23529-0309 = FIN\ 359$, Docobo and Ling (1997) obtained almost identical results.

REFERENCES

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 Zulević, D.: 1993, *Bull. Astron. Belgrade*, **147**, 63.

Table 1. Orbital elements, masses and parallaxes

<i>WDS</i>	00057+4549	00576+5424	08017-0836	21044-1951	23529-0309
<i>ADS</i>	48	795	6526	–	–
Name	<i>STT 547AB</i>	<i>HLD 4</i>	<i>A 1580</i>	<i>FIN 328</i>	<i>FIN 359</i>
m	8.8-8.9	9.0-9.5	7.4-8.9	5.2-6.5	6.7-6.7
Sp	dK6-dM0	G0	F5	A5V	G9III
$P(y)$	374.238	278.390	152.390	18.721	22.554
$n(^{\circ}/y)$	0.96195	1.29315	2.36236	19.22957	15.96187
T	2072.33	1992.23	2028.81	1977.01	1988.85
$a(^{\prime\prime})$	6.634	0.5713	0.4816	0.3923	0.0812
e	0.551	0.8267	0.7862	0.8409	0.3871
$i(^{\circ})$	64.56	44.81	80.45	119.36	134.00
$\Omega(^{\circ})$	20.77	104.85	114.35	49.20	36.80
$\omega(^{\circ})$	273.19	197.37	268.71	96.07	127.38
A	1.35454	0.25670	0.07725	0.11770	-0.01262
B	-2.52972	-0.49602	0.02309	-0.15636	-0.06540
F	6.13661	0.33019	-0.19689	-0.27029	-0.07216
G	2.49728	0.26400	0.43935	-0.28200	-0.01122
C	-5.98092	-0.12020	-0.47477	0.33998	0.04640
H	0.33354	-0.38427	-0.01067	-0.03612	-0.03544
M_A	9.26	4.07	2.82	3.25	0.58
M_B	9.36	4.57	4.32	4.55	0.58
$\mathcal{M}_{A\odot}$	0.56	1.14	1.53	1.41	2.49
$\mathcal{M}_{B\odot}$	0.55	1.04	1.18	1.14	2.49
π''_{dyn}	0.1235	0.0103	0.0121	0.0407	0.0060

Table 2. Measurements and (O - C)

ADS 48						
t	θ_t	ρ_t	n	<i>Obs.</i>	$\Delta\theta$	$\Delta\rho$
1876.07	110 ^o .9	4 ^{''} .49	3	OΣ	-0 ^o .172	0 ^{''} .077
1876.29	111.3	4.24	4	Δ	0.056	-0.173
1879.81	113.9	4.35	2	HI	-0.081	-0.074
1880.73	114.9	4.47	4	β	0.206	0.043
1881.72	114.5	4.42	2	Big	-0.960	-0.012
1882.70	116.4	4.55	1	OΣ	0.183	0.113
1889.82	121.1	4.35	2	HΣ	-0.554	-0.135
1894.19	123.7	4.90	3	Frhj	-1.224	0.375
1895.68	124.3	4.38	3	A	-1.725	-0.161
1895.88	126.5	4.36	3	Con	0.328	-0.183
1898.75	129.0	4.62	3	Hu	0.732	0.044
1901.66	130.9	4.67	1	Hu	0.539	0.057
1905.93	133.8	4.47	4	β	0.430	-0.202
1907.97	135.5	4.74	6	Prz2...	0.720	0.038
1911.12	137.0	4.75	10	Dob 4,...	0.080	-0.002
1913.41	139.3	4.87	11	Sic 4,...	0.852	0.081
1915.90	140.8	4.74	4	Dob 2,...	0.719	-0.092
1920.24	142.4	4.94	8	VBs 3,...	-0.459	0.031
1920.826	143.1	4.99	4	Bzt	-0.127	0.070
1920.845	143.0	5.00	2	GΣ	-0.239	0.079
1921.39	143.1	5.01	20	Abt3	-0.480	0.079
1921.72	144.0	4.84	4	B	0.214	-0.097
1921.772	143.85	4.97	1	Btz	0.031	0.032
1923.130	145.2	4.86	2	GΣ	0.540	-0.103
1923.792	145.3	5.04	2	d	0.233	0.064
1923.82	145.1	5.03	13	GΣ,...	0.016	0.054
1923.948	145.7	5.03	3	GΣ	0.538	0.051
1924.90	145.9	5.02	4	B	0.157	0.023
1925.41	149.8	5.10	4	Dob 3,...	3.747	0.094
1926.73	145.0	4.82	3	Bz	-1.848	-0.212
1926.96	146.5	5.24	3	Kom	-0.486	0.204
1927.851	147.5	5.02	4	GΣ	-0.018	-0.034
1942.64	155.5	5.15	5	Bz	-0.327	-0.199
1943.89	156.5	5.37	2	VBs	0.013	-0.003
1949.931	159.26	5.528	4	Mul	-0.334	0.035
1951.05	160.1	5.37	3	Bz	-0.055	-0.144
1952.509	160.9	5.42	1	Luplau-Janssen	0.020	-0.122
1952.952	160.8	5.60	4	W. Knudsen	-0.298	0.049

Table 2. (continued)

ADS 48						
t	θ_t	ρ_t	n	<i>Obs.</i>	$\Delta\theta$	$\Delta\rho$
1953.864	161 ^o .18	5'' .514	7	R	-0 ^o .366	-0'' .054
1955.949	162.33	5.572	5	R	-0.230	-0.035
1958.95	343.9	5.72	4	HÖG	-0.096	0.059
1959.620	164.32	5.694	?	Kamper	0.007	0.021
1960.708	164.87	5.724	1	Kiselev	0.046	0.032
1961.745	165.41	5.714	1	Kiselev	0.101	0.004
1962.85	165.8	5.77	3	Cou	-0.022	0.041
1964.920	166.5	5.80	5	Soulie	-0.273	0.037
1966.89	167.7	5.80	?	?	0.031	0.006
1968.798	168.44	5.817	1	Cou	-0.088	-0.006
1969.721	168.77	5.837	1	Cou	-0.170	0.000
1970.944	169.56	5.844	1	Kamper	0.077	-0.010
1971.804	169.84	5.865	1	Kamper	-0.024	-0.001
1972.704	170.30	5.913	1	Kamper	0.040	0.034
1973.797	170.81	5.898	1	Josties et al.	0.071	0.005
1973.812	350.6	5.94	4	Wor	-0.145	0.047
1973.901	170.88	5.897	1	Kiselev	0.096	0.003
1974.711	170.6	6.06	4	Walker	-0.538	0.155
1974.748	171.17	5.909	1	Josties	0.016	0.004
1974.882	171.46	5.908	1	Kiselev	0.248	0.001
1975.655	171.50	5.925	1	Josties	-0.048	0.009
1975.677	171.53	5.910	1	Kiselev	-0.028	-0.006
1976.700	171.90	5.933	1	Kiselev	-0.100	0.004
1977.876	172.49	5.964	1	Kiselev	-0.017	0.022
1978.69	172.62	5.959	3	Pannunzio et al.	-0.237	0.008
1978.820	172.93	5.974	1	Kiselev	0.017	0.022
1979.680	173.27	5.979	1	Kiselev	-0.011	0.018
1980.755	173.86	5.987	1	Kiselev	0.121	0.015
1981.700	174.07	5.989	1	Stz	-0.071	0.009
1983.750	175.15	6.017	1	Stz	0.141	0.019
1984.232	175.1	5.87	2	Zul	-0.112	-0.131
1985.758	175.85	6.015	1	Stz	-0.004	0.003
1985.977	175.2	5.86	2	Pop	-0.746	-0.153
1985.978	176.0	5.93	2	Zul	0.053	-0.084
1992.883	179.7	5.99	1	Doc	0.871	-0.052
1994.796	180.64	6.178	5	Pop	1.015	0.135
1994.796	179.022	6.158	5	Pav	-0.603	0.115

Table 2. (continued)

ADS 795						
t	θ_t	ρ_t	n	<i>Obs.</i>	$\Delta\theta$	$\Delta\rho$
1881.58	125 ^o .0	0".97	3	Bu	3 ^o .122	-0".002
1888.86	123.6	1.25	3	Com	0.378	0.300
1909.20	124.5	0.94	5	ADS	-2.918	0.076
1913.8	132.8	0.78	1	Gro	4.304	-0.060
1953.90	143.5	0.51	4	VBs	0.473	-0.023
1955.91	140.0	0.6	1	Mull	-4.273	0.088
1956.05	140.8	0.57	1	Mull	-3.563	0.059
1959.80	149.6	0.50	5	hz	2.599	0.030
1962.30	153.5	0.47	4	WBs	4.468	0.028
1963.834	150.8	0.40	4	Wor	0.387	-0.024
1968.99	157.9	0.35	3	hz	1.819	-0.011
1971.82	162.7	0.32	3	hz	2.551	-0.005
1976.82	174.2	0.21	3	hz	3.973	-0.047
1977.862	173.3	0.24	4	Wor	0.259	-0.003
1979.85	180.5	0.18	3	hz	1.040	-0.035
1983.892	194.4	0.16	1	Cou	-4.788	-0.001
1984.90	208.1	0.15	2	?	1.855	0.001
1987.7596	227.4	0.125	1	?	-5.711	0.003
1988.6608	242.5	0.111	1	?	-1.386	-0.005
1991.9043	293.8	0.102	1	?	2.196	0.003
ADS 6526						
1907.24	132.8	0.300	3	A	0.600	0.000
1917.12	138.6	0.280	2	A	-0.519	0.013
1944.294	181.7	0.140	1	VBs	5.978	-0.020
1944.88	188.8	0.250	4	Voute	11.779	0.091
1951.058	187.1	0.160	1	VBs	-5.117	0.014
1951.069	188.3	0.140	1	VBs	-3.946	-0.006
1986.8896	261.1	0.247	1	McAl et al.	-3.275	0.011
1987.2745	265.4	0.239	1	McAl et al.	0.635	0.002
1989.9363	268.3	0.246	1	Hartkopf et al.	0.976	-0.002
1990.3488	266.9	0.249	1	Hartkopf et al.	-0.801	-0.000
1990.9219	267.3	0.247		See Ref.	-.917	-.005
1991.9052	272.2	0.250		CHARA 3	3.118	-.005

Table 2. (continued)

FIN 328						
t	θ_t	ρ_t	n	$Obs.$	$\Delta\theta$	$\Delta\rho$
1976.4552	54 ^o .9	0 ^{''} .178			-0 ^o .650	0 ^{''} .024
1976.6246	51.3	0.112			2.670	-0.011
1981.4737	161.5	0.303			0.089	0.001
1982.7627	149.9	0.315			-1.167	-0.008
1983.4259	144.9	0.327		See Ref.	-1.313	-0.005
1985.4902	134.8	0.370		CHARA 3	2.327	0.016
1990.3445	103.4	0.354			-0.188	-0.006
1990.3472	103.7	0.356			0.128	-0.004
1991.7152	94.6	0.338			-0.304	-0.004
1991.7207	94.7	0.342			-0.167	-0.000
1992.4498	89.8	0.334			0.047	0.008
FIN 359						
1976.6247	88 ^o .9	0 ^{''} .094			1 ^o .938	0 ^{''} .006
1976.8569	84.1	0.089			-0.855	0.000
1976.9224	84.3	0.089			-0.099	-0.000
1977.6350	78.1	0.086			-0.498	-0.007
1977.9190	74.0	0.093			-2.400	-0.001
1978.6153	70.9	0.097			-0.333	0.000
1979.7702	62.5	0.096			-0.666	-0.004
1980.7177	58.5	0.097			1.715	-0.003
1980.7232	58.1	0.102			1.352	0.002
1981.4656	53.6	0.097			1.859	-0.002
1981.7007	49.3	0.098			-0.832	-0.001
1982.5060	41.7	0.108			-2.748	0.012
1982.7655	43.3	0.091			0.767	-0.004
1983.7103	36.0	0.087		See Ref.	1.007	-0.002
1984.8481	23.7	0.071		CHARA 3	-0.138	-0.006
1985.4930	14.2	0.071			-1.410	0.003
1985.8428	11.1	0.060			0.930	-0.003
1986.8885	351.1	0.040			4.670	-0.007
1987.7622	322.8	0.042			11.285	0.005
1988.6633	281.5	0.042			14.498	0.003
1989.7172	234.8	0.049			4.038	-0.002
1989.9327	215.6	0.057			-9.713	0.004
1990.7548	199.5	0.077			-8.106	0.018
1990.9238	199.3	0.055			-5.053	-0.005
1991.7266	187.0	0.048			-2.787	-0.014
1993.9249	162.1	0.069			9.381	0.005
1994.7029	138.4	0.069			-1.992	0.003

Table 3a. Ephemeris

	ADS 48		ADS 795		ADS 6525	
t	θ	ρ	θ	ρ	θ	ρ
1998.0	181 $^{\circ}$.0	6 $''$.039	37 $^{\circ}$.7	0 $''$.132	274 $^{\circ}$.0	0 $''$.276
1999.0	181.4	6.036	46.2	0.151	274.7	0.279
2000.0	181.8	6.032	52.7	0.170	275.4	0.282
2001.0	182.2	6.027	57.9	0.190	276.1	0.285
2002.0	182.6	6.021	62.1	0.210	276.8	0.287
2003.0	183.0	6.014	65.6	0.229	277.5	0.289
2004.0	183.5	6.006	68.6	0.248	278.1	0.291
2005.0	183.9	5.997	71.2	0.267	278.8	0.293
2006.0	184.3	5.987	73.4	0.285	279.4	0.294
2007.0	184.7	5.975	75.3	0.302	280.1	0.295

Table 3b. Ephemeris

	FIN 328		FIN 359	
t	θ	ρ	θ	ρ
1998.0	183 $^{\circ}$.8	0 $''$.249	98 $^{\circ}$.1	0 $''$.081
1998.5	177.8	0.264	93.2	0.084
1999.0	172.5	0.277	88.5	0.087
1999.5	167.6	0.289	84.2	0.089
2000.0	163.0	0.299	80.1	0.092
2000.5	158.8	0.308	76.2	0.094
2001.0	154.7	0.316	72.5	0.096
2001.5	150.9	0.323	68.9	0.098
2002.0	147.2	0.330	65.4	0.099
2002.5	143.7	0.336	62.0	0.100

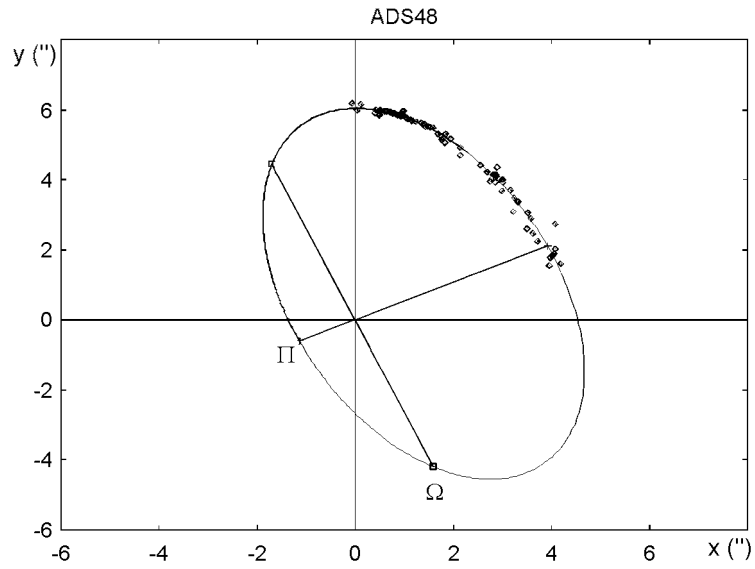


Fig. 1.

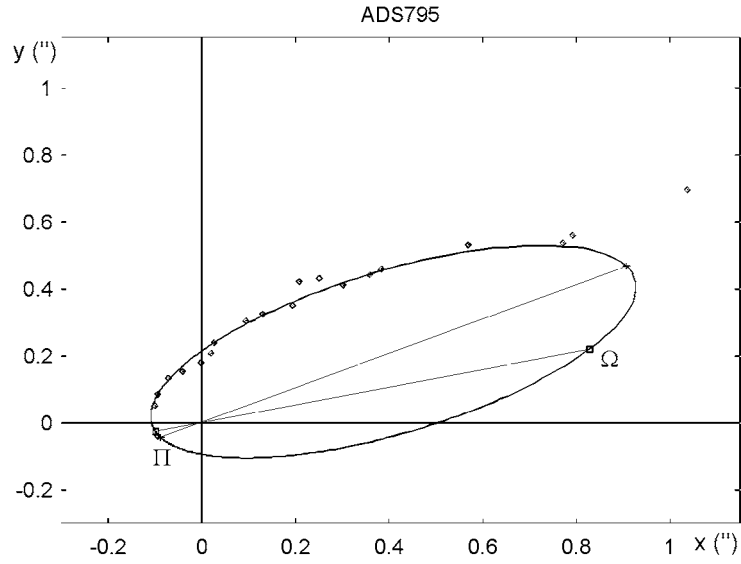


Fig. 2.

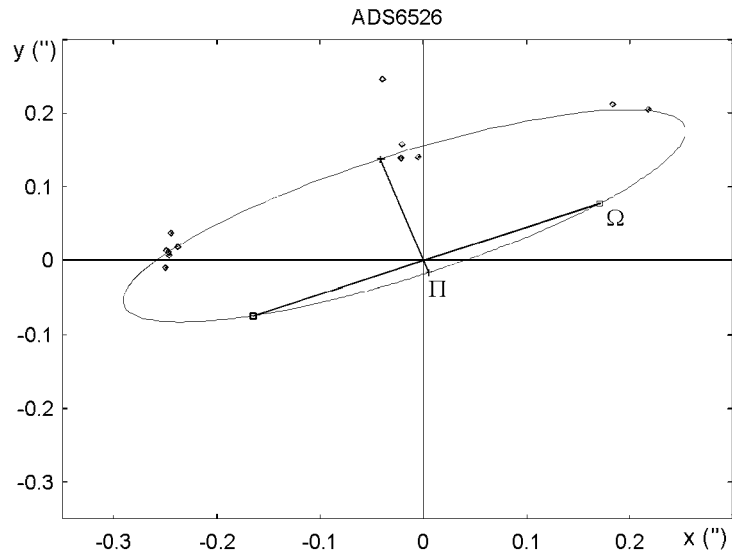


Fig. 3.

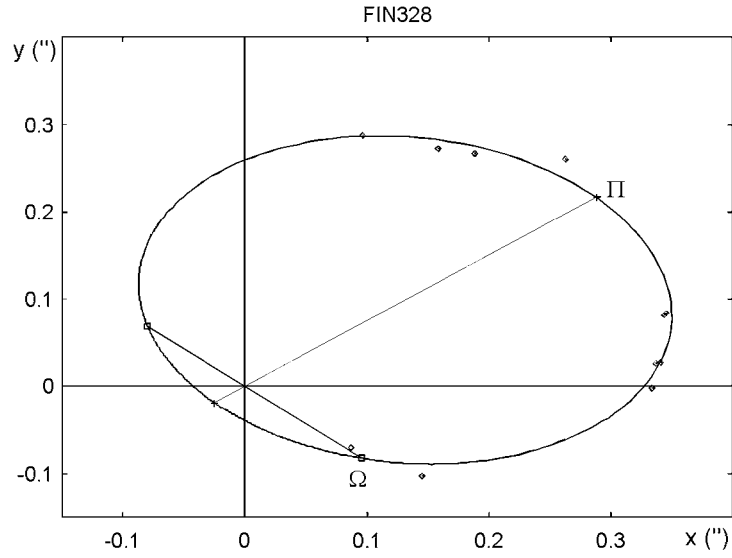


Fig. 4.

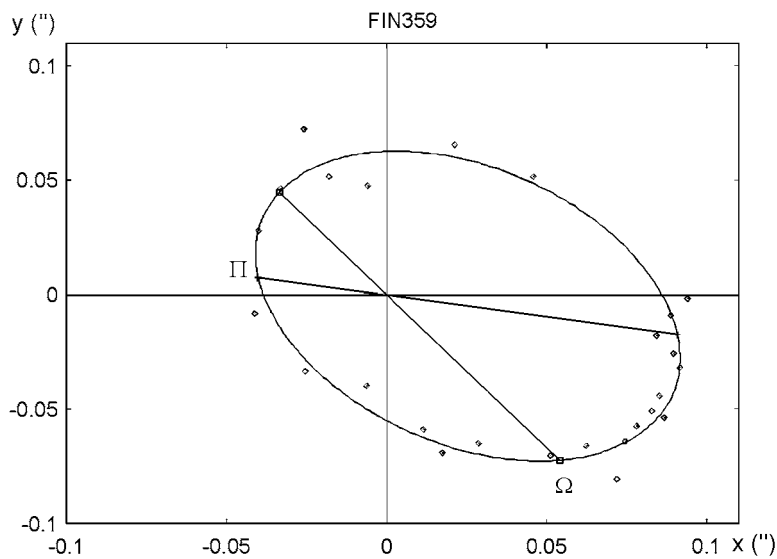


Fig. 5.

НОВИ ОРБИТАЛНИ ЕЛЕМЕНТИ ЗА 5 ДВОЈНИХ ЗВЕЗДА

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УДК 521.328

Претходно саопштење

У раду се саопштавају орбитални елементи и одговарајуће астрофизичке величине за следеће парове двојних звезда: WDS 00057

+4549 = ADS 48, WDS 00576+5424 = ADS 795, WDS 08017-0836 = ADS 6526, WDS 21044-1951 = FIN 328 и WDS 23529-0309 = FIN 359.