

NEW ORBITAL ELEMENTS OF FOUR VISUAL BINARIES

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SUMMARY: We present new orbital elements, masses and dynamical parallaxes for visual binaries: ADS 3326, ADS 6582, ADS 10429 and ADS 10858.

INTRODUCTION

The differences (O-C) of the most recent measurements of visual binarie ADS 3326 (Mc Allister H.H., Hartkopf I.W. 1988), calculated on the basis of the preliminary orbital elements (Erceg V., 1975) show large deviations.

For these reasons new, as well as masses and dynamical parallaxes following from them, are calculated.

The orbit ADS6582 = A 1971 is a preliminary one and there are two solutions, both fitting well the observations. The first solution by Zulević (1979) yields $P = 151.83yr.$, $e = 0.61$. The second one is presented in this paper and it yields $P = 319.72yr.$, $e = 0.00$.

For the parallax of the system ADS 10429 we took the spectroscopic one of the component A evaluated by Adams (Adams et al, 1935). The mass of the system is determined on the basis of the spectroscopic parallax also. Although this pair does not lie on the main sequence of the HR diagram, its dy-

namic parallax is close to the spectroscopic one: it is 0."013. Component A is giant.

The system ADS 10858 AB is above the main sequence of the HR diagram. For the calculation of π , M , \mathcal{M} we used the mass-magnitude relation for the stars above the main sequence reported in Popović, Angelov, (1975).

RESULTS

Table 1 contains the basic data concerning our pairs: the orbital elements (classical and vectorial), the masses, the dynamical parallaxes, the ephemeris, the observations used for the purpose of calculating the orbit and the corresponding differences. Table 3 contains the ephemerides.

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Table 1 Orbital elements, masses and parallaxes

Name ADS IDS vis. mags. Sp.	P n T a	e i Ω ω	A B F G	C H T_{Ω} T_{Ω}	$\mathcal{M}_{A\odot}$ $\mathcal{M}_{B\odot}$ M_A M_B	π	Author
A 1840 AB 3326 04361N0801 8.8-8.8 A0	115 ^y 22 3°1245 1889.43 0".258	0.654 121°9 56°7† 71°7	+0".1527 -0".0034 -0".0987 -0".2282	\pm 0".2080 \pm 0".0687 1884.87 1899.29	1.40 1.40 3 ^m 3 3 ^m 3	0".008	Olević- Čatović
A 1971 AB 6582 08061S0046 9.1-9.2 G5	319 ^y 72 1°126 1989.20 0".910	0.000 116°1 12°7† 0°0	+0".890 +0".2000 +0".0880 -0".3920	\pm 0".0000 \pm 0".8026 1989.20 2149.06	0.98 0.96 5 ^m 1 5 ^m 2	0".0156	Zulević
A 2984 AB 10429 17114S0029 4.9 - 7.9 K0	206 ^y 31 1°7449 1895.45 0".700	0.550 25°4 152°3† 37°1	-0".6716 -0".0782 +0".1394 -0".6428	\pm 0".1811 \pm 0".2395 1890.027 1945.820	6.05 6.05 0 ^m 2† 3 ^m 1	0".011†	Popović- Čatović
Σ 3128 AB 10858 17528S0754 7.6 - 11.1 G5	259 ^y 46 1°3875 1945.89 0".985	0.875 122°0 23°0† 153°8	-0".7235 -0".5575 -0".5833 +0".2612	\pm 0".3501 \mp 0".7115 1912.68 1946.52	1.41 0.82 3 ^m 8 7 ^m 3	0".017	Popović- Čatović

†(epoch 2000.0)

‡(Adams W.S. et al 1935)

NEW ORBITAL ELEMENTS OF FOUR VISUAL BINARIES

Table 2a Measurements and (O-C)

t	θ_t	e	n	Obs.	$\Delta\theta$	Δe
ADS 3326 = IDS 04361N0801 = A 1840 AB						
1908.76	221.0	0".28	2	A	+0.5	+0".02
1918.89	213.8	0.28	3	A	+4.6	-0.00
1932.04	219.3	0.29	1	Gro	+23.5	+0.01
1933.12	195.9	0.24	2	B	+1.2	-0.04
1934.03	192.3	0.30	2	A	-1.4	+0.02
1935.06	188.4	0.22	2	B	-4.17	-0.06
1937.71	185.5	0.25	4	Voû	-4.2	-0.02
1944.75	182.1	0.24	3	Voû	+0.7	-0.02
1945.75	179.0	0.28	5	VBs	-1.1	-0.02
1948.74	168.2	0.19	2	VBs	-8.0	-0.06
1951.03	167.8	0.17	2	VBs	-5.3	-0.07
1951.80	167.3	0.20	3	VBs	-4.7	-0.04
1956.16	173.1	0.27	3	Mull	+7.6	+0.04
1958.03	157.7	0.19	3	VBs	-4.8	-0.04
1960.73	161.8	0.21	3	Cou	+3.8	-0.01
1960.809	158.8	0.22	1	Wor	+0.9	+0.00
1962.599	151.8	0.18	3	Wor	-2.9	-0.03
1962.788	154.4	0.20	4	B	+0.02	-0.01
1964.116	150.0	0.20	1	Cou	-2.0	-0.01
1965.66	153.1	0.27	4	Bz	+4.0	+0.06
1968.84	143.8	0.22	3	Morel	+1.0	+0.02
1980.907	113.100	0.175	1	McA	-2.74	-0.005
1982.852	109.190	0.180	1	McA	-1.85	-0.002
1983.050	112.889	0.179	1	McA	+2.35	-0.002
1986.830	101.171	0.165	1	McA	+0.31	-0.013

Table 2b Measurements and (O-C)

t	θ_t	ϱ	n	Obs.	$\Delta\theta$	$\Delta\varrho$
ADS 6582 = IDS 08061S0046 = A 1971 AB						
1908.97	104°6	0".35	3	A	+1°.2	-0".05
1919.92	71.4	0.51	2	A	-5.5	+0.07
1930.39	57.9	0.51	5	Voû3, A2	+0.3	-0.01
1932.31	53.4	0.60	4	B	-1.4	+0.06
1936.22	48.0	0.56	9	Voû4, VBs5	-1.6	-0.02
1938.03	47.2	0.60	12	Fin4, Bz4, SMW4	-0.2	+0.01
1942.68	41.2	0.69	6	VBs3, Voû3	-1.2	+0.05
1945.35	40.2	0.61	5	B4, Jef1	+0.4	-0.06
1947.24	40.0	0.66	5	SMW3, GTB2	+1.9	-0.03
1952.39	35.0	0.65	8	VBs2, B3, Cou3	+1.1	-0.08
1955.55	32.2	0.76	8	Wor6, Bz2	+0.6	+0.00
1958.84	28.4	0.87	7	B2, Hei5	-0.9	+0.08
1961.07	28.4	0.82	15	B8, Wor4, VBs3	+0.5	+0.02
1964.55	29.6	0.83	6	Hei4, Wor1, KNP1	+3.9	+0.00
1969.39	25.2	0.87	6	Bz2, Wor4	+2.3	+0.01
1976.22	19.6	0.83	9	HLN7, D2	+0.4	-0.06
1977.10	19.0	0.82	4	Wor	+0.2	-0.07
1990.20	12.1	0.85	2	D2	-0.1	-0.06

NEW ORBITAL ELEMENTS OF FOUR VISUAL BINARIES

Table 2c Measurements and (O-C)

t	θ_t	ρ	n	Obs.	$\Delta\theta$	$\Delta\rho$
ADS 10429 = IDS 17114S0029 = A 2984 AB						
1915.54	298°3	0".52	3	A	+3°3	+0".02
1917.19	299.20	0.55	5	COM	+0.5	+0.02
1919.72	301.10	0.53	7	COM4,A3	-2.6	-0.4
1923.60	309.40	0.60	2	A	-0.7	-0.03
1925.62	311.50	0.70	2	A	-1.5	+0.04
1931.42	320.40	0.71	7	VBSG,A1	+0.3	-0.02
1933.83	321.10	0.76	12	FUR1,A7,BOS4	-1.5	-0.00
1937.08	324.00	0.83	17	VOU4,SMW2,DURG,BAZ5	-1.7	+0.03
1940.30	323.10	0.85	13	DUR1,SMW5,BAZ7	-5.5	+0.02
1943.88	328.50	0.88	13	VOU3,DUR1,VBS4,BAZ5	-3.0	+0.02
1949.71	333.00	0.93	16	BAZ5,WRH3,VOU3,RAB5	-2.9	+0.02
1952.62	335.60	0.96	14	WRH3,RAB7,BAZ4	-2.3	+0.03
1955.75	339.40	0.94	14	WOR,RAB7	-0.6	-0.01
1958.19	341.90	0.93	15	B8,COU2	+0.3	-0.03
1961.74	342.30	0.92	17	HEI4,B9,BAZ4	-1.4	-0.06
1963.81	342.80	1.02	9	WOR4,HEI2,COU3	-2.2	+0.03
1967.59	345.50	0.99	7	BAZ3,WOR4	-1.7	-0.01
1973.44	348.60	1.10	7	WAK4,HEI3	-2.0	+0.08
1976.54	351.80	1.07	4	POP1,WAK3	-0.5	+0.04
1980.898	356.10	0.95	8	POP3,WOR3,ZUL2	+1.4	-0.08
1984.870	359.10	1.15	8	HEI2,POP2,LBU4	+2.2	+0.12
1987.136	360.40	1.02	9	POP4,ZUL2,LBU3	+2.2	-0.01
1989.022	361.00	0.99	4	ZUL3,POP1	+1.8	-0.04

Table 2d Measurements and (O-C)

t	θ_t	ϱ	n	Obs.	$\Delta\theta$	$\Delta\varrho$
ADS 10858 = IDS 17528S0754 = Σ 3128 AB						
1834.24	26°6	1" 52	3	STF	-6°5	-0" 19
1835.66	24.0	1.52	2	STF	-9.0	-0.19
1844.44	25.5	1.45	1	MAD	-6.6	-0.24
1867.73	27.4	1.53	4	D	-2.1	-0.06
1878.32	35.0	1.25	1	BU	+6.8	-0.26
1879.55	32.0	1.51	1	HWE	+4.0	+0.02
1886.30	26.0	1.19	1	LV	-1.1	-0.24
1923.49	not	seen	1	GCB		
1930.20	12.6	0.48	4	B	-1.4	-0.10
1934.59	5.7	0.40	4	B	-3.2	-0.02
1936.37	358.9	0.51	4	VOU	-6.0	+0.17
1938.11	2.4	0.37	3	B	+2.6	+0.11
1946.53	not	found	1	VBS		
1947.50	not	found	1	VBS		
1948.64	not	found	1	VBS		
1955.40	287.0†	-	2	HEI		
1958.52	86.0	0.40	1	B	+14.3	+0.06
1963.42	68.9	0.51	11	B	+6.0	+0.05
1965.67	65.7	0.57	8	B4,NBG4	+5.5	+0.06
1967.67	51.0	0.61	2	NBG	-7.2	+0.05

†uncertain

Table 3 Ephemerides

t	ADS3326		ADS6582		ADS10429		ADS10858	
	θ	e	θ	e	θ	e	θ	e
1993.00	83.71	0.17	10.82	0.91	0.84	1.03	45.86	1.03
1995.00	77.45	0.16	9.82	0.91	1.95	1.03	45.33	1.06
1997.00	70.49	0.15	8.81	0.90	3.06	1.03	44.84	1.09
1999.00	62.21	0.13	7.80	0.90	4.18	1.02	44.36	1.12
2001.00	51.15	0.11	6.77	0.89	5.30	1.02	43.92	1.14
2003.00	32.48	0.08	5.73	0.88	6.44	1.01	43.49	1.17

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НОВИ ОРБИТАЛНИ ЕЛЕМЕНТИ ЗА ЧЕТИРИ ВИЗУАЛНО ДВОЈНЕ ЗВЕЗДЕ

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Израчунати су нови орбитални елементи, масе и динамичка паралакса за четири визуално двојне звезде: ADS 3326, ADS 6582, ADS 10429 и ADS 10858.