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Optical positions of radio stars. I.

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Abstract. — The optical positions of 31 radio stars obtained from the observations with the photoelectric astrolabe at Yunnan Observatory are presented in this paper. These are all the stars in the astrometric catalogue of radio stars observable by our astrolabe.

Key words: astrometry — radio continuum: stars

1. Introduction

After being automated and equipped with a photon counter, the photoelectric astrolabe of Yunnan Observatory can automatically be operated to observe stars and the stars as faint as those of magnitude 11.0. The objects which can be observed with the instrument have been selected into the program from the astrometric catalogue of radio stars (Walter et al. 1990) in order to contribute to the link of the optical reference frame to the VLBI reference frame based on extragalactic objects. During one year of observations the optical positions of 31 radio stars are obtained from two transits each. The internal mean errors of the right ascensions and declinations are $\pm 0\overset{s}{.}0037$ and $\pm 0''.065$, respectively.

2. Observations and reductions

The observational and reduction procedure is the same one described in Hu Hui et al. (1994). Similarly, the same method described in the paper is adopted to calculate the differences YPA-CAT (where CAT stands for the positions in FK5 or CMC, and CMC stands for Carlsberg Meridian Catalogue), and the differences YPA-RSS (where RSS stands for the radio positions given in the astrometric catalogue of radio stars). The results indicate that the YPA's external accuracy is very good.

3. Explanation of Table 1

The resulting optical positions for the 31 radio stars are presented in Table 1.

Column 1: the number in the astrometric catalogue of radio stars.

Column 2: the number of FK5 or CMC, where the one that is larger than 1000 is that of the CMC.

Column 3: observed mean visual magnitude.

Columns 4 and 6: right ascension and declination for equator and equinox J2000.0 and epoch of observation.

Columns 5 and 7: mean errors of right ascension and declination.

Columns 8 and 9: the number of the observed transits in east and west, respectively.

Column 10: mean epoch of observations minus 1900.00.

Column 11: the root-mean-square error.

Columns 12 and 13: differences YPA-CAT in right ascension and declination, respectively. Definition of Da: $\mathrm{Da} = [\alpha(\mathrm{YPA}) - \alpha(\mathrm{CAT})]\cos^{\delta}$. The units of Da and Db are $0''.01$.

Columns 14 and 15: the differences YPA-RSS in right ascension and declination, respectively. The units of Da and Db are $0''.01$.

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Table 1. 31 radio star positions. (Mean Julian epoch of observations; equator and equinox J2000)

No.	FK5/CMC	Mg.	α	m_α	δ	m_δ	N_c	N_w	Epoch −1900	σ	YPA-CAT Da	YPA-CAT Db	YPA-RSS Da	YPA-RSS Db
			h m s	°	° ′ ″	″				″		″ (0.01)		
1025	107	2.49	3 02 16.778	0.002	4 05 23.50	0.02	33	33	93.90	0.02	1	9		
1026	111	2.11	3 08 10.136	0.001	40 57 20. 38	0.04	37	36	93.88	0.02	8	−6	9	7
2113	206	2.19	5 32 00. 398	0.006	0 17 56.87	0.05	26	23	93.79	0.06	3	0		
1143	502	4.93	13 34 47.759	0.003			21	36	93.31	0.03	−1		1	
1265	890	3.80	23 37 33.757	0.003	46 27 31.98	0.03	28	34	93.77	0.03	1	−5		
1010	200882	5.47	1 16 36.340	0.004	−2 30 00.85	0.02	22	21	93.83	0.03	2	12		
1014	200944	6.13	1 25 35.663	0.001			39	39	93.87	0.02	−11			
1028	202151	6.56	3 26 35.364	0.001			37	26	93.89	0.02	−7		−11	
1036	202534	4.75	4 18 14.583	0.005	50 17 44.15	0.04	25	23	93.90	0.04	7	−3	−6	−5
1061	203137	7.83	5 41 02.300	0.004	−2 43 00.80	0.03	34	28	93.91	0.04	−10	3		
2658	403092	6.94	5 41 26.771	0.003	3 46 40.74	0.05	28	21	93.59	0.05	2	−9		
2129	203320	9.25	6 03 53.644	0.005			23	30	93.81	0.08	1			
2166	305351	8.82	7 27 24.164	0.005	15 39 34.98	0.16	29	21	93.59	0.09	5	18		
1084	203994	4.36	7 43 18.697	0.001			23	35	93.79	0.02	−1			
2183	504954	9.87	8 39 08.542	0.006			25	21	93.61	0.10	0			
2706	504987	8.66	8 43 56.153	0.003			28	21	93.62	0.07	16			
1118	308465	10.62	11 40 46.367	0.011	51 59 53.44	0.07	22	21	93.28	0.07	5	23		
1137	205167	8.32	13 10 36.931	0.004			21	21	93.23	0.06	−9		−11	
1140	408965	8.25	13 30 46.836	0.004			21	21	93.23	0.08	10		9	
1147	205365	6.81	13 56 09.562	0.002			22	21	93.23	0.04	−6			
2298	311678	10.63	15 39 15.242	0.004			27	30	93.35	0.06	−8			
2340	510310	8.32	17 10 25.588	0.005	48 57 56.43	0.04	21	31	93.30	0.04	−12	−12		
1189	206848	7.28	17 58 06.999	0.005	15 08 21.46	0.17	21	28	93.36	0.08	−2	2	10	8
2356	412354	9.74	17 58 38.517	0.004			21	21	93.36	0.08	−7			
1207	207399	5.96	19 08 25.858	0.007	52 25 33.03	0.04	28	21	93.40	0.04	−4	−21		
2442	208226	8.10	20 19 32.443	0.003	38 43 53.86	0.11	22	30	93.55	0.05	17	−21		
1225	413912	6.77	20 20 27.983	0.003	43 51 16.32	0.06	21	26	93.57	0.03	0	−9	−3	11
1227	316186	9.24	20 32 22.431	0.005	41 18 19.29	0.14	22	21	93.56	0.08	−5	12	6	31
2460	208831	7.51	21 02 25.870	0.002			26	32	93.62	0.03	7			
1251	317881	6.39	22 30 06.519	0.003	49 21 23.40	0.03	28	25	93.74	0.03	−5	−6		
1271	210622	5.89	23 49 40.963	0.001			30	33	93.78	0.02	1			
	Mean										−1	−8	″ (0.001) 4	104
	Standard	error of	mean								13	30	28	58
	Standard	deviation									73	125	85	130