GENERAL PROGRAM FOR BINARY STARS RESEARCH AT MAYDANAK

M. M. Zakirov, A. S. Hojaev, and G. C. Arzumanyants
Astronomical institute, Tashkent, Uzbekistan

ABSTRACT

The extensive close binary research program carring out at High Altitude Maydanak Observatory (Uzbekistan) by means of the UBVR photoelectric photometry on 1.0 m and 0.6 m Zeiss telescopes is described. It includes more than 240 close binary systems (CBS) in 89 different stellar aggregates. Lightcurves of CBS as well as their orbital elements derived by us are presented.

An exploration of binary stars is important not only for study of their intrinsic variability but also as sufficiently precise key to solve the tasks of stellar physics and cosmogony as well as of astrophysics in whole. In particular the investigation of CBS permits us to identify pecularities in early stages of evolution of binary stars and stars in general.

The binary stars research at Maydanak was beginning in 1970-s (see, for example, Zakirov, 1980) and later has became more composite. At present this program covers in common about 250 CBS with circular as well as eccentric orbits in 89 various open star clusters, associations and star forming regions. The observations are obtained on 1.0 m and 0.6 m Zeiss reflectors using phototube photometers in Johnson's UBVR system.

As an illustration in Fig.1 the lightcurves for IT Cas, WZ Cep and UU Oph are presented.

The lightcurves of eclipsing binaries are processed by means of Lavrov's (1976) direct computing method and the geometric parameters of these CBS are determined. As an example the reduced list for CBS of our program with some observational results and derived orbital elements of them is given in Table 1.

On a level with geometric elements of CBS's orbits we determined the photometric values of the components and their main characteristics as masses, radii in solar units, absolute visual magnitudes and spectral classes for lot of them.

Our programme is in strong need of spectral observations of program CBS in addition to our photometrical ones to compute their absolute parameters .

We would like to thank A.A.Azimov, N.R.Bayramov and V.V.Ignatova for participation in obtaining of observational data in the frame of our program.

REFERENCES

Lavrov, M.I. 1976, Perem.Zv., Suppl.(in rus.), 2, 349

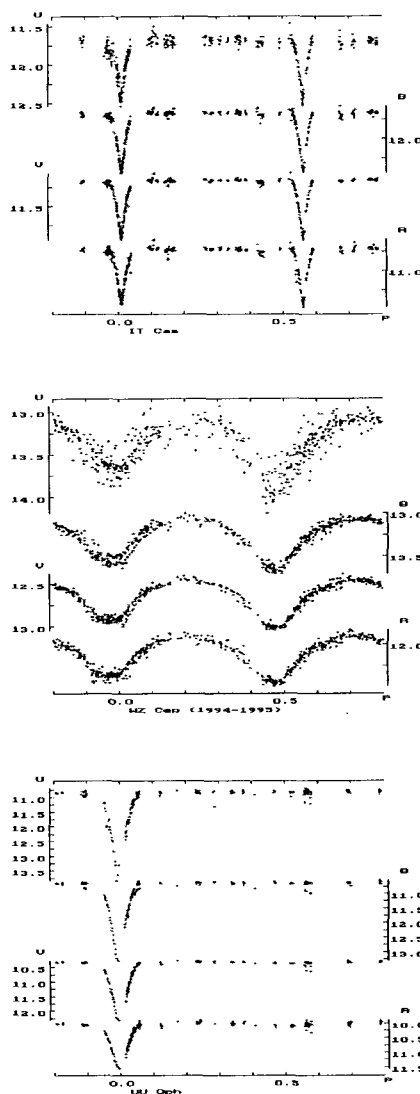Zakirov, M.M. 1980, PhD Thesis, Sternberg Astron. Inst., Moscow

Fig. 1.— Lightcurves of CBS IT Cas(a), WZ Cep(b) and UU Oph(c)

Table 1. Draft Catalogue of Maydanak Program CBS

Star	Type	Period	Vmax	VminI	VminII	r(1)	r(2)	i	x(1)	x(2)	L(1)
CBS in star forming regions											
FF Ori	EA	1.81	11.23	12.13	11.32	0.290	0.225	77.8	0.62	0.45	0.19
FH Ori	EA	2.15	11.26	12.42	11.29	0.376	0.290	85.7	0.45	0.60	0.99
FK Ori	EA	1.95	11.20	12.55	11.29	0.277	0.240	82.1	0.65	0.50	0.11
FR Ori	EB	0.88	10.71	11.70	10.84	0.346	0.281	81.7	0.55	0.60	0.94
AM Tau	EA	13.62	10.08	11.22	10.15	0.312	0.240	87.7	0.52	0.62	0.93
HS Per	EA	2.83	12.28	14.88	12.32	0.266	0.158	82.7	0.4	0.6	0.09
UU Oph	EA	4.39	10.29	12.30	10.40						
WZ Cep	EW	0.42	12.44	13.02	12.93						
CBS in star clusters											
BS Sct	EA	3.82	11.07	12.48	11.15	0.254	0.159	81.2			0.194
V448Cyg	EB	6.52	7.91	8.60	8.34	0.494	0.276	75.2	0.24	0.24	0.611
V453Cyg	EA	3.89	8.28	8.70	8.66	0.288	0.176	86.7			0.734
V454Cyg	EB	2.32	11.34	12.87	11.73	0.302	0.281	89.0	0.27	0.34	0.738
V478Cyg	EA	2.88	8.58	8.98	8.96	0.289	0.281	77.5	0.24	0.24	0.504
CBS with eccentric orbits											
IT Cas	EA	3.89	11.18	11.91	11.90						
PV Cas	EA	1.75	9.78	10.36	10.30						
V541Cyg	EA	15.33	10.34	11.05	—						
V364Lac	EA	7.35	8.37	9.04	8.95						