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IMPROVED LIGHT ELEMENTS OF W GRUIS

The purpose of this note is to present five new times of minimum light of the southern eclipsing binary W Gru, to give an improved (4 years baselined) photoelectric linear ephemeris and to recalculate the parabolic ephemeris given by Cerruti and De Laurenti (1981). History of this object is also given in the latter reference.

The observations were made during 1981 and 1982 at CTIO* in the U, B, V bands. Individual minima together with that determined by Cerruti and De Laurenti (1981) are listed in Table I. The standard errors are given in brackets, they were determined from the light curves on each pass-band. A least squares linear ephemeris gives:

$$\text{Min I} = \text{HJD } 2444517^{d}.6963 + 2^{d}.9685249\ E, \qquad (1)$$
$$\pm.0006 \quad \pm.0000034 \text{ m.e.}$$

In Table I we also list the cycles E with their weights and the residuals (O-C) from the above ephemeris.

The minimum defined by (1) together with those determined by Pickering (1913), Payne-Gaposchkin (1947) and Imbert (1974) gives the following least squares parabolic ephemeris:

$$\text{Min I} = \text{HJD } 2430132^{d}.153 + 2^{d}.9685021\ E + 7^{d}.52\ \ 10^{-9}\ E^{2} \qquad (2)$$
$$\pm.017 \quad \pm.0000026 \quad \pm0.69\ \ 10^{-9}\text{m.e.}$$

Residuals from the parabolic ephemeris are presented in Table II, labelled as Table I. The (O-C) residuals and the resulting increase of the period at a constant rate of 0.080 sec/y confirm our previous results (Cerruti and De Laurenti, 1981). Figure 1 depicts the (O-C) residuals from (2).

*CTIO is operated by AURA under contract with the NSF (USA).

Table I

Times of minima and residuals for linear ephemeris

Min.	Band	HJD(sigma) 2400000+	E(w)	(O-C)
I	V	43778.5326(2)	-249.0(7.1)	-0.0010
I	B	43778.5309(3)	-249.0(5.8)	-0.0027
I	U	43778.5263(11)	-249.0(3.0)	-0.0073
I	V	43781.4987(3)	-248.0(5.8)	-0.0034
I	B	43781.4992(2)	-248.0(7.1)	-0.0029
I	U	43781.4970(5)	-248.0(4.5)	-0.0051
II	V	43818.6125(5)	-235.5(4.5)	0.0038
II	B	43818.6144(2)	-235.5(7.1)	0.0057
II	U	43818.6153(10)	-235.5(3.2)	0.0066
II	V	44177.8042(2)	-114.5(7.1)	0.0040
II	B	44177.8046(4)	-114.5(5.0)	0.0044
II	U	44177.8030(3)	-114.5(5.8)	0.0028
I	V	44517.6947(4)	0.0(5.0)	-0.0016
I	B	44517.6947(7)	0.0(3.8)	-0.0016
I	U	44517.6935(15)	0.0(2.6)	-0.0028
II	V	44830.8771(7)	105.5(3.8)	0.0014
II	B	44830.8764(6)	105.5(4.1)	0.0007
II	U	44830.8758(8)	105.5(3.5)	0.0001
II	V	44833.8435(4)	106.5(5.0)	-0.0007
II	B	44833.8438(6)	106.5(4.1)	-0.0004
II	U	44833.8436(6)	106.5(4.1)	-0.0006
II	V	44839.7774(8)	108.5(3.5)	-0.0038
II	B	44839.7790(9)	108.5(3.3)	-0.0022
II	U	44839.7770(4)	108.5(5.0)	-0.0042
II	V	44842.7510(6)	109.5(4.1)	0.0012
II	B	44842.7514(4)	109.5(5.0)	0.0016
II	U	44842.7493(4)	109.5(5.0)	-0.0005
II	V	45228.6577(7)	239.5(3.8)	-0.0003
II	B	45228.6599(3)	239.5(5.8)	0.0019
II	U	45228.6585(6)	239.5(4.1)	0.0005

Table II

Times of minima and residuals for parabolic ephemeris

Min.	Meth.	HJD(sigma) 2400000+	E(w)	(O-C)
II	vis.	10001.6	-6781.5(1.0)	-0.0015
I	ph.	30132.156	0.0(3.0)	0.0033
I	sp.	41569.88(55)	3853.0(1.3)	-0.0231
I	UBV	44517.6963(06)	4846.0(4.1)	0.0056

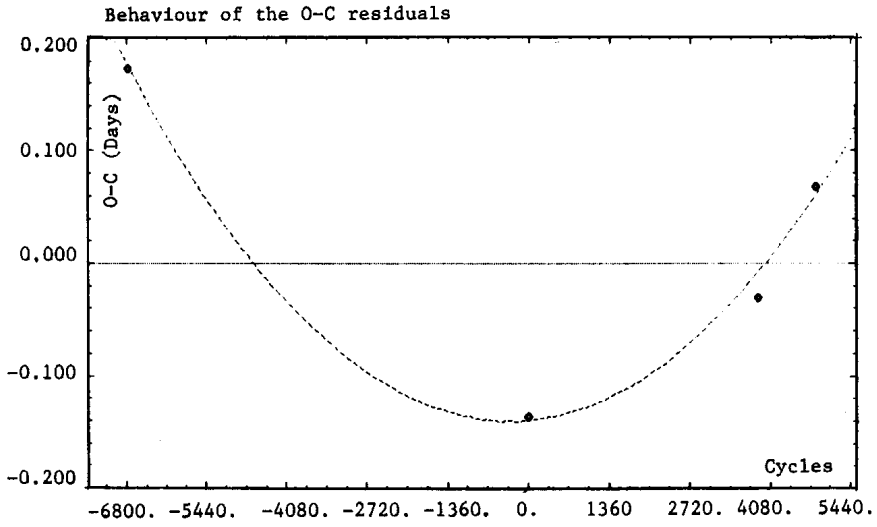

Figure 1

The light curve constructed with 2500 individual observations and a classical orbital analysis will be published elsewhere.

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