CONSTANCY OF PERIOD IN XX LEONIS

(Letter to the Editor)

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Abstract. An updated period study of XX Leonis gives a revised period, $P = 0^d.970939$, and indicates constancy of the period since its earliest observation.

The eclipsing binary XX Leonis (= XX Leo = 355.1934 = P 3370 = BD+14°2177) was first observed by Tsesevich (NL 44). Although, Sandig (1947), Kurochkin (1949), Tsesevich (1954), Huth (1965) and others have observed XX Leonis, yet very little is known about this system.

Epochs and periods given by some observers are listed in Table I. No detailed period study of XX Leonis exists in the literature.

In all, 12 minima (observed during 1944–1991) have been collected from the literature, and updated period study of XX Leonis has been attempted in this communication.

Employing the epoch, JD 2431169.379 (Tsesevich, 1954), these minima give a slightly improved period, $P = 0^d.970939$ of the system. $O - C$ values, based on the following ephemerides:

(1) Primary Minimum = JD 2431169.379 $\pm$ $0^d.97094\,E$ (Tsesevich, 1954)
and

(2) Primary Minimum = JD 2431169.379 $\pm$ $0^d.970939\,E$ (present), have been derived (Table II), and $O - C$ diagrams, Figures 1a and 1b, respectively, have been drawn, which reveal the constancy of period in XX Leonis (alongwith an inappreciable period fluctuation around 1989), although the system XX Leonis, has been indicated to be of β Lyrae type by Brancewicz and Dworak (1980).

References

Brancewicz, H.K. and Dworak, T.Z.: 1980, *Acta Astron.* **30**, No. 4, 501.
Huth, P.: 1965, Mitt. Veränderl. Sterne **2**.
Kurochkin, N.E.: 1949, *Perem. Zvezd.* **6**, No. 6, 303.
Sandig, H.U.: 1947, *Astron. Nachr.* **275**, 37.
Tsesevich, V.P.: 1954, *Odd. Izv.* **4**, No. 2.

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TABLE I

Epochs and periods of XX Leo

Sl. No.	Author	Epoch and period
1	Tsesevich (1954)	JD 2431169.379+0^d.97094 E
2	Wood et al. (1980)	JD 2442561.384+0^d.97094 E
3	Danielkiewicz-Krósniak and Kurpińska-Winiarska (1991)	JD 2431169.418+0^d.97094 E
4	Srivastava (present work)	JD 2431169.379+0^d.970939 E

1. Tsesevich, V.P.: 1954, *Odd. Izv.* **4**, No. 2.
2. Wood F.B. *et al.*: 1980, *Publ. Univ. Pennsylvania Astron. Ser. Vol XII*, p. 120.
3. Danielkiewicz-Krósniak, E. and Kurpińska-Winiarska, M.: 1991, *Rocznik Astronomiczny Obserwatorium Krakowskiego*, No. 62, 92.

TABLE II

Minima of XX Leo

J.D.⊙	Min.	Type of min.	Based on $P = 0^d.97094$ Cycle	Mean of cycles	$O-C$	Mean of $O-C$ values	Based on $P = 0^d.970939$ Cycle	Mean of cycles	$O-C$	Mean of $O-C$ values	Reference
2431169.379	I	pg(v)	0		$0^d.000$		0		$0^d.000$		Tsesevich, V.P.: 1954, Odd. Izv. 4, No.(2)
				0		$0^d.020$		0		$+0^d.020$	
2431169.418	I	v	0		$+0^d.039$		0		$+0^d.039$		Danielkiewicz-Krósniak, E. and Kurpińska-Winiarska, M.: 1991, SAC 62
2442460.452	I	v	11629		$+0^d.012$		11629		$+0^d.024$		Diethelm, R.: 1975, BBS 21, 3
2442464.292	I	v	11633		$-0^d.032$		11633		$-0^d.020$		Locher, K.: 1975, BBS 21, 3
2442464.293	I	v	11633		$-0^d.031$		11633		$-0^d.019$		Diethelm, R.: 1975, BBS 21, 3
				11677		$-0^d.008$		11677		$+0^d.004$	
2442528.499	I	v	11699		$+0^d.093$		11699		$+0^d.105$		Diethelm, R.: 1975, BBS 22, 3
2442561.364	I	v	11733		$-0^d.054$		11733		$-0^d.042$		Locher, K.: 1975, BBS 22, 3
2442561.384	I	v	11733		$-0^d.034$		11733		$-0^d.022$		Wood et al.: 1980, PPEN Vol. XII, 120
2447274.355	I	v	16587		$-0^d.005$		16587		$+0^d.011$		Peter, H.: 1988, BBS 88, 4
				16739		$-0^d.023$		16739		$-0^d.006$	
2447568.515	I	v	16890		$-0^d.040$		16890		$-0^d.023$		Moschner, W. and Kleikamp, W.: 1989, BAV-Mitt. 52
2448085.450	II	v	17422		$-0^d.130$		17422		$-0^d.113$		Peter, H.: 1988, BBS 96, 4
				17669		$-0^d.005$		17669		$+0^d.013$	
2448564.374	II	pe	17915		$+0^d.120$		17915		$+0^d.138$		Blätter, E.: 1992, BBS 99, 4

BAV. Mitt.: Bedeckungsergebnisse der Berliner Arbeitgemeinschaft für Veränderliche Sterne, Mitteilungen

BBS: Bedeckungs Veränderlichen Beobachter der Schweizerischen Astronomischen Gessellschaft Bulletin

Odd. Izv.: Oddesa Izvestia

PPEN: Publications of the University of Pennsylvania Astronomical Series

SAC: Rocznik Astronomiczny Obserwatorium Krakowskiego

Wood, et al.: Wood, F.B., Oliver, J.P., Florkowski, D.R. and Koch, R.H.

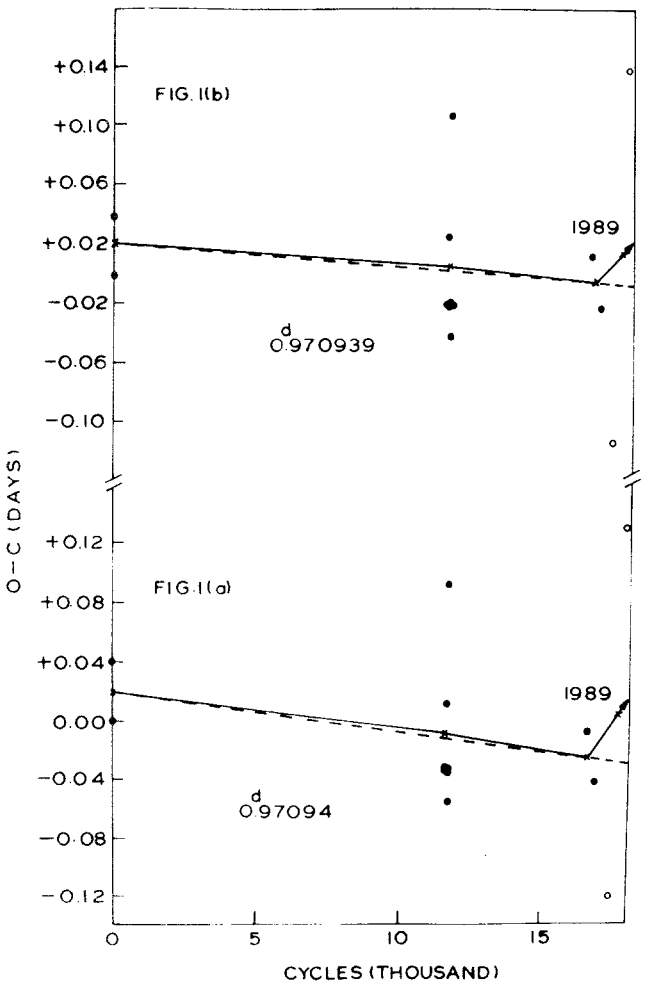

Fig. 1. $O - C$ diagrams of XX Leonis with periods, $P = 0^d.970939$ (*top: (a)*) and $P = 0^d.97094$ (*bottom (b)*), respectively. $O - C$ values of primary and secondary minima are shown as filled and open circles respectively, while the mean $O - C$ values are shown as crosses. Solid lines show period trends of XX Leonis (indicating a fluctuation of period around 1989, which is inappreciable). Dashed lines show the constancy of period in XX Leonis.