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PERIOD CHANGES OF RT PERSEI

The rediscussion of the period changes of the close binary system RT Persei performed by Frieboes-Conde and Herczeg (1973) seems to be very interesting. They postulated a sudden change of the orbital period occurring somewhere around JD 2419550 (1912). Thus they were able to determine a light-time orbit which was in good agreement with the existent minima.

Now, if we keep up the hypothesis of a third component, it seems necessary to postulate another sudden change in the orbital period occurring somewhere around JD 2435433 (1956). That is why, in order to build up the corresponding O-C diagram, the following formulae are to be used:

$$\text{Min.hel.} = \text{JD } 2419550.251 + 0^{\text{d}}.8494135 \cdot E \quad t < 1912$$

$$\text{Min.hel.} = \text{JD } 2419550.251 + 0.8494061 \cdot E \quad 1912 < t \leq 1956$$

$$\text{Min.hel.} = \text{JD } 2435433.296 + 0.8494033 \cdot E' \quad t > 1956$$

As is known, RT Persei is a semi-detached close binary system and the "observed" sudden period changes could be considered as real facts. In such cases the evaluation of the periodic variation caused by the presence of a third body will be very difficult. We have tried to do that and the following empirical formulae have been established:

$$(O-C)_c = 0^{\text{d}}.017 \sin(0^{\circ}.0195E + 81^{\circ}) + 0^{\text{d}}.0022 \sin 2(0^{\circ}.0195E + 73^{\circ}), \quad t < 1956$$

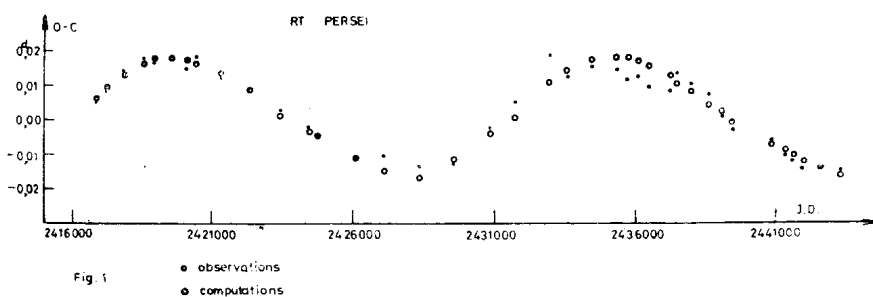
$$(O-C)_c = 0.017 \sin(0.0195E' + 85) + 0.0022 \sin 2(0.0195E' + 77), \quad t > 1956$$

If the second postulated sudden change in the orbital period was a real one, the corresponding light-time orbit would be characterized by the following constants:

$$P' = 43 \text{ years}, \quad a' \sin i' = 3.04 \text{ a.u.}$$

$$e' = 0.26 \quad t_0 = \text{JD } 2432459$$

$$\omega = 17^{\circ} \quad m_3 = 0.5 m_{\odot}$$



As we can see in Figure 1, new series of observed minima are required in order to see if there is a satisfactory agreement between "observed" and computed O-C differences, and to prove if the two postulated sudden changes in the orbital period are or are not real.

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Reference:

Frieboes-Conde, H., and Herczeg, T., 1973, *Astron. Astrophys.*
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