

Sezione Stelle Variabili UAI GRAV

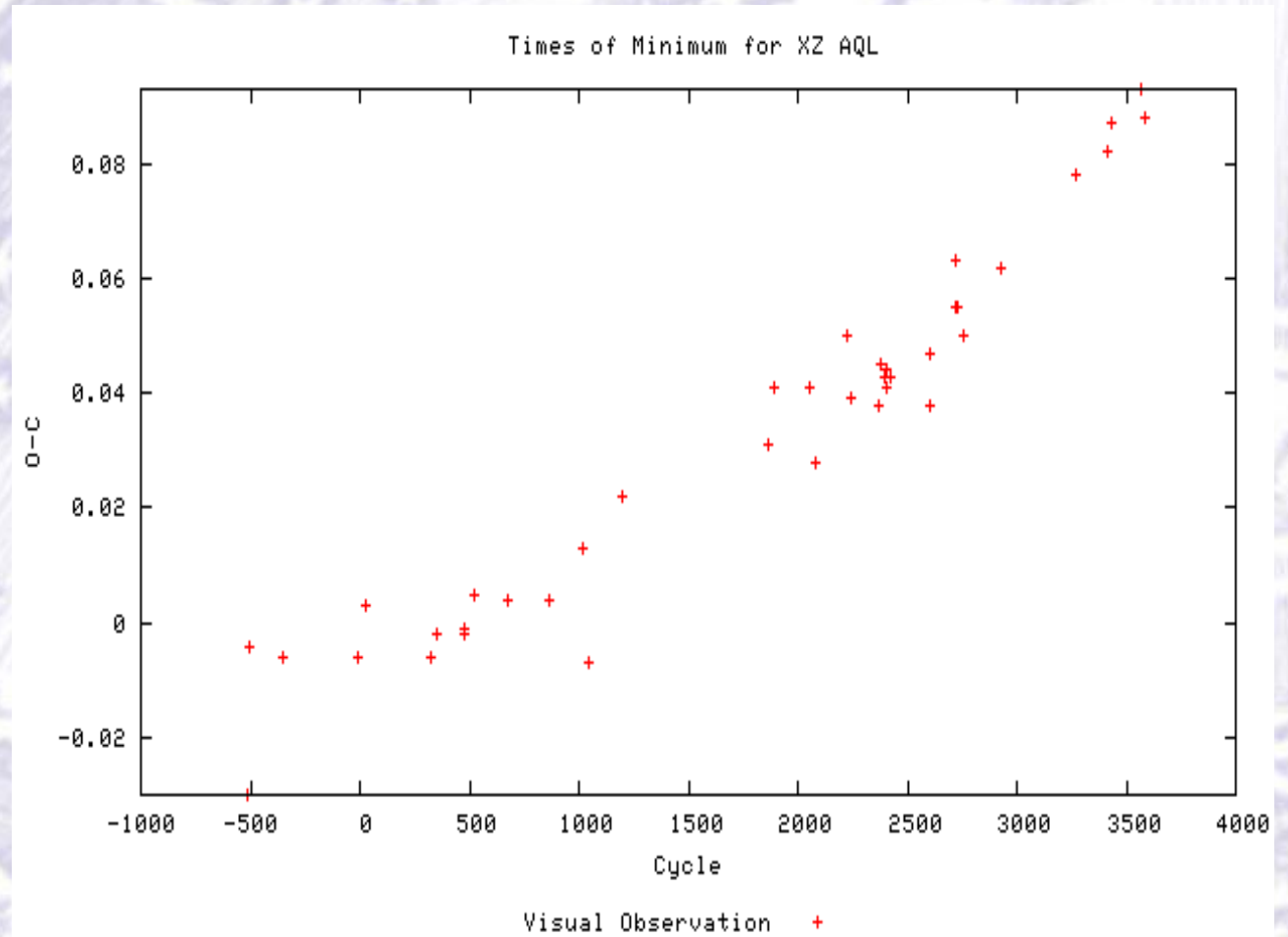
Il diagramma dei residui (O-C)

Riccardo Papini

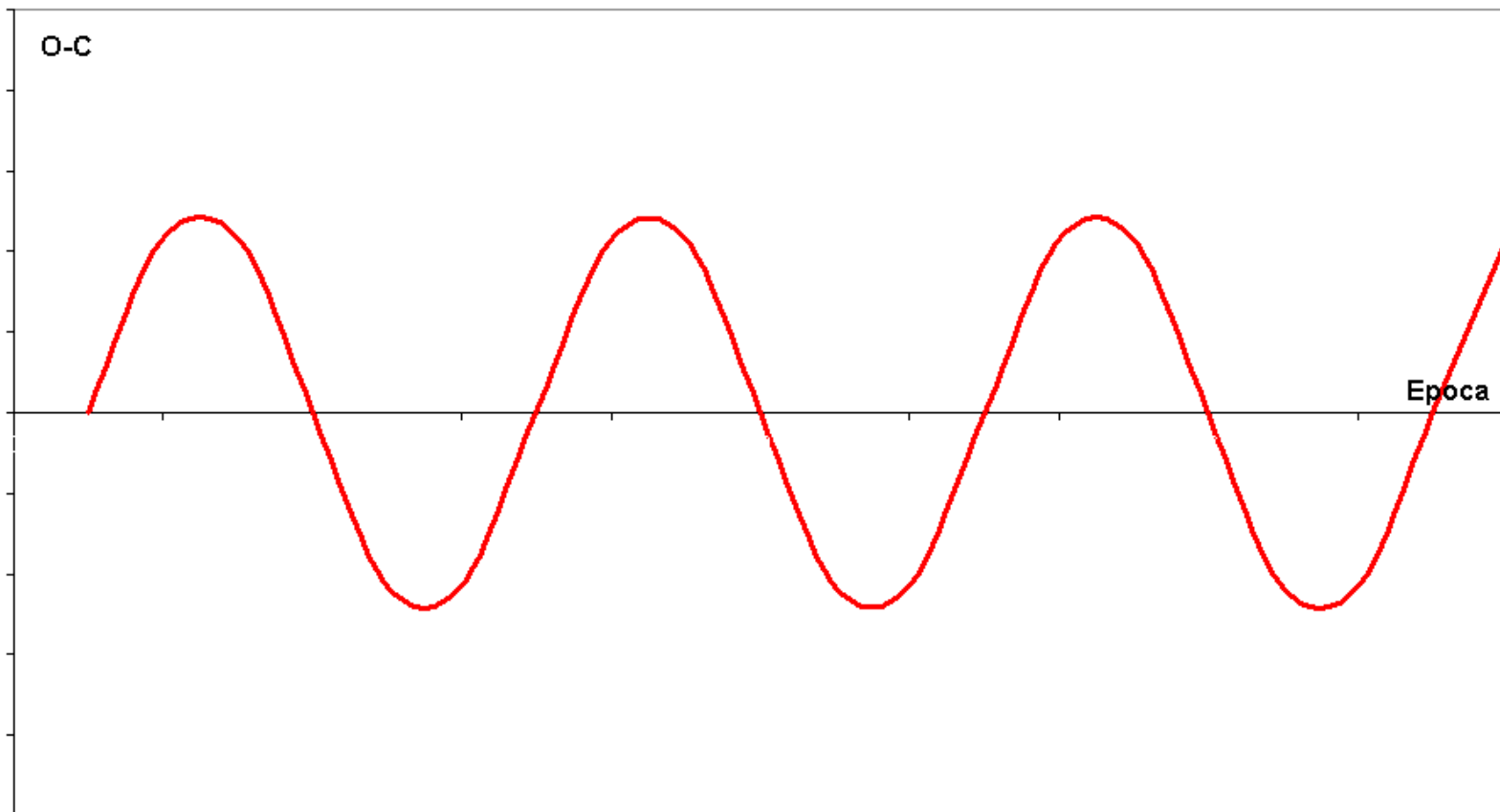
AMELIA 15-16 Maggio 2010

VI meeting SSV UAI GRAV

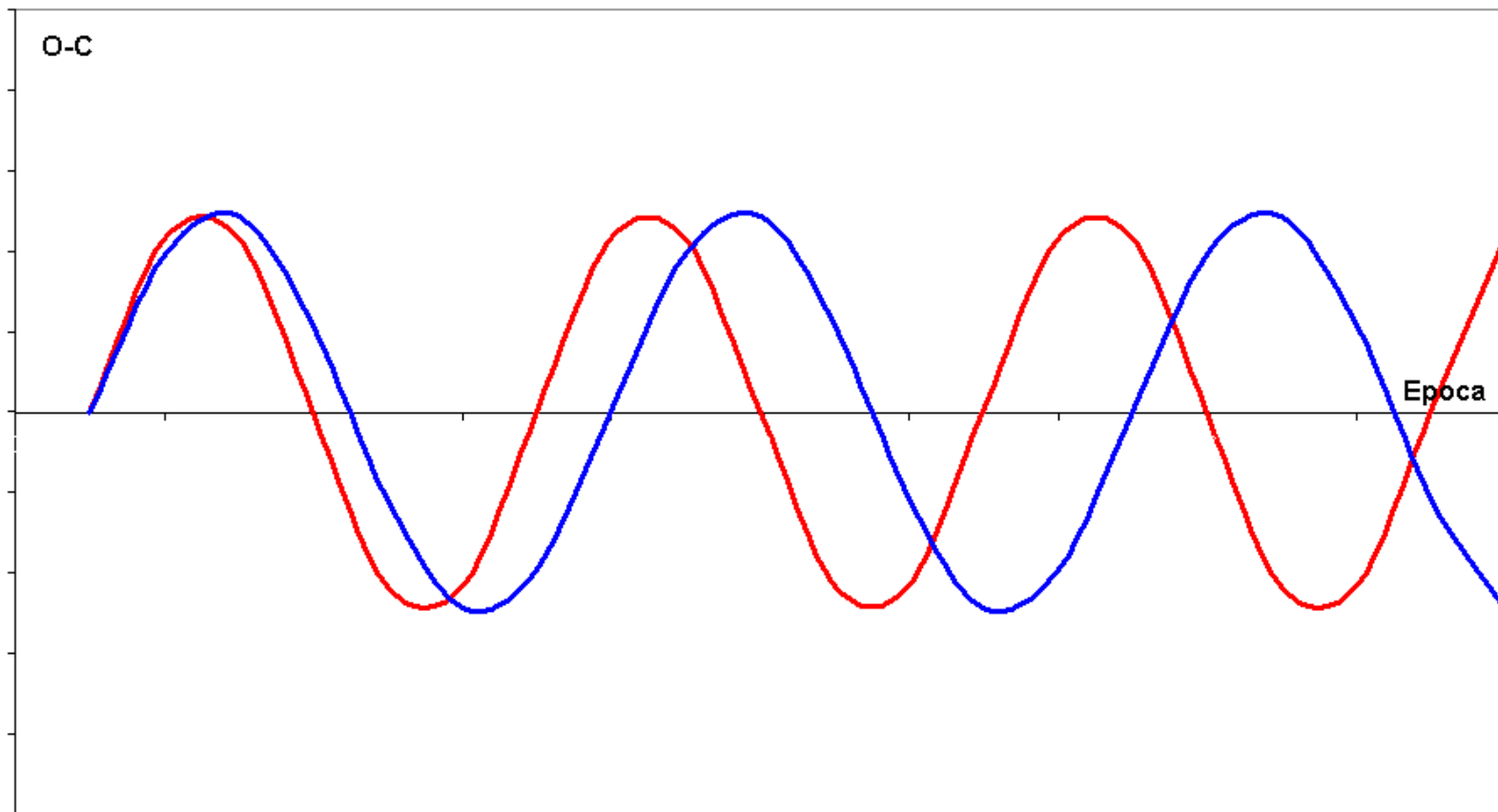
Cos'è un diagramma O-C?



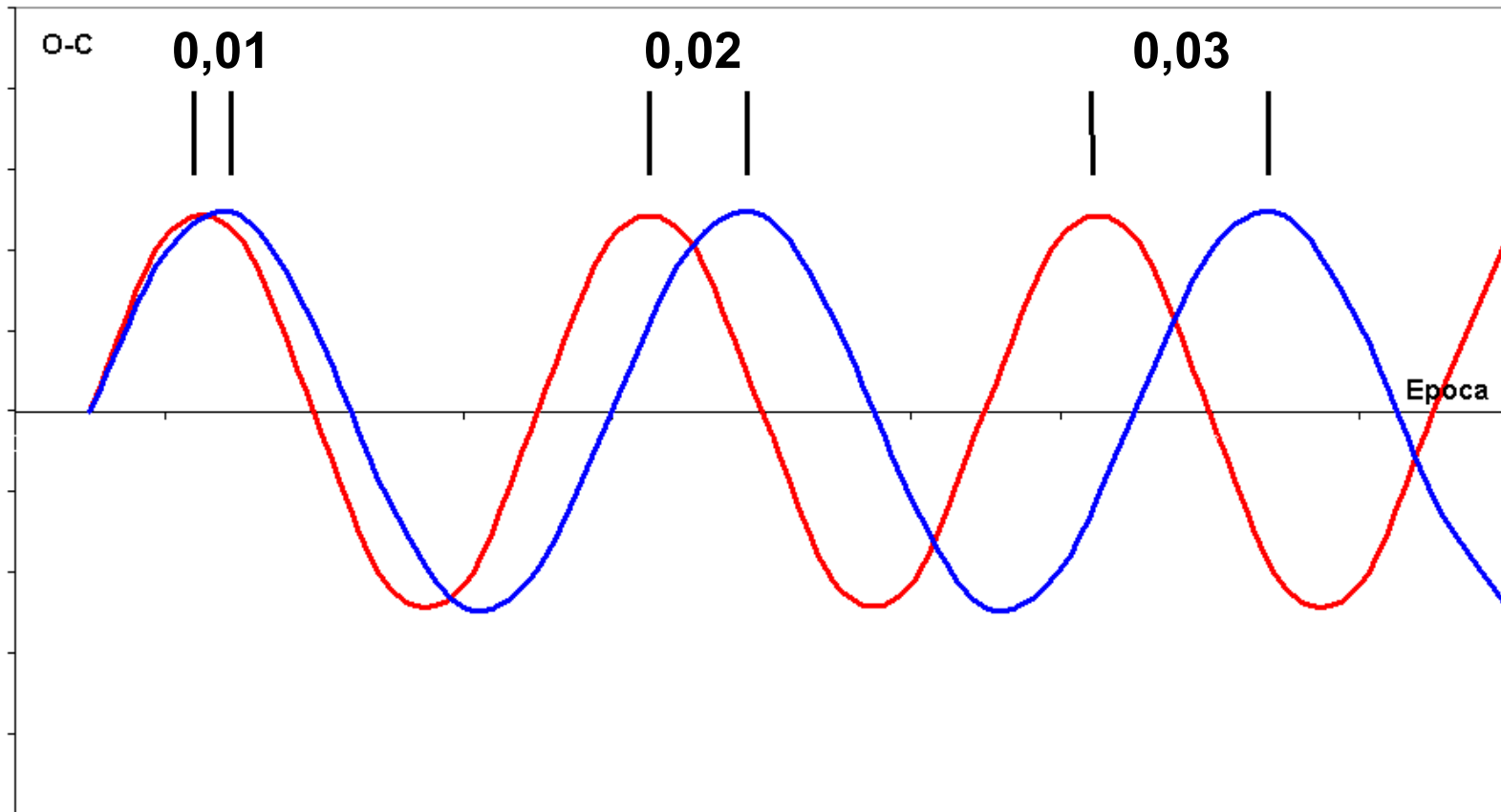
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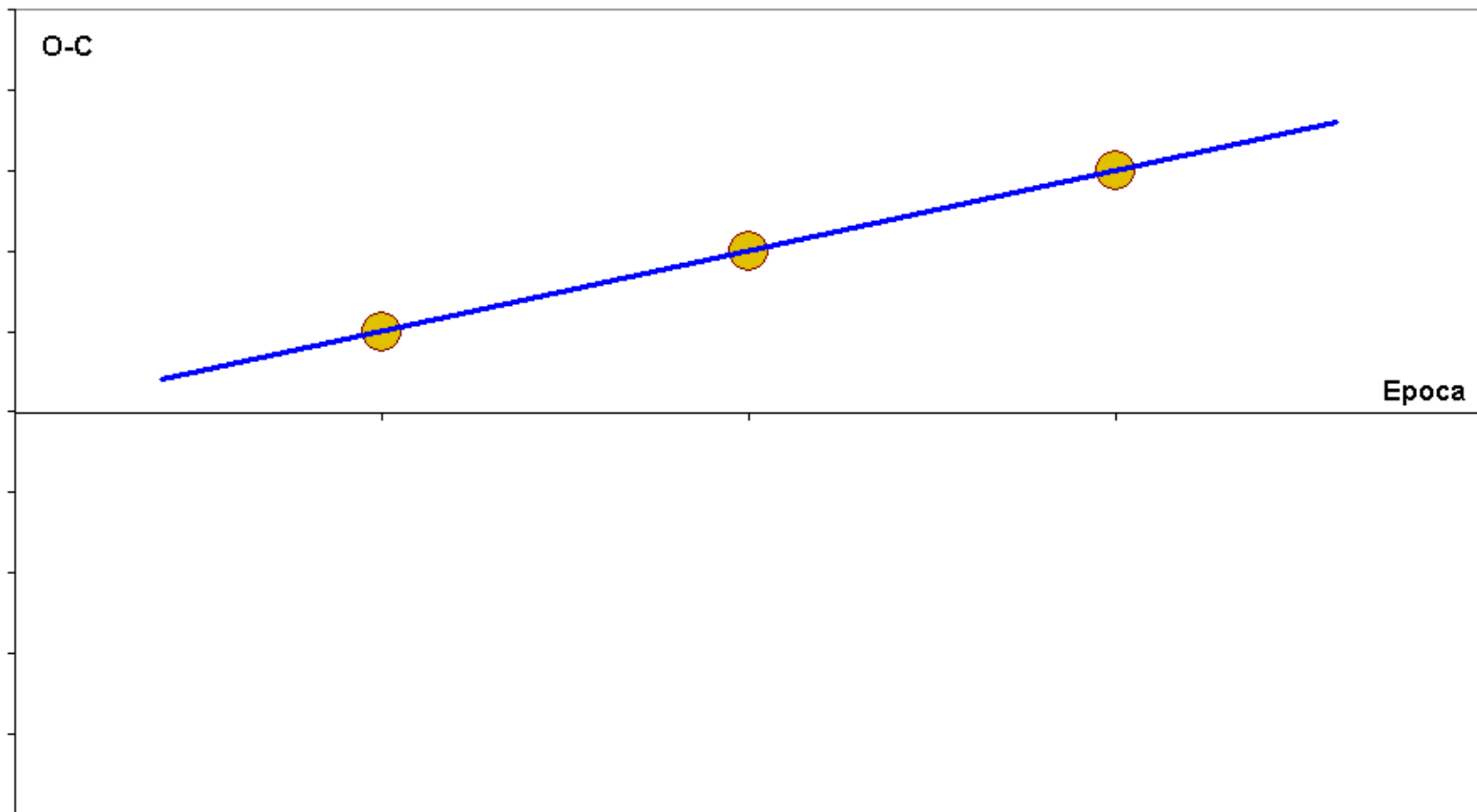
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Elementi dell'effemeride (lineare)

E_0 : Epoca (del minimo)

P : Periodo

n : numero di cicli

$$C = E_0 + n \times P \text{ (effemeride)}$$

Nota: valida per periodi di tempo limitati

Differenti espressioni dell'effemeride

Quadratica

$$E = E_0 + p \times n + k_1 \times n^2$$

Cubica

$$E = E_0 + p \times n + k_1 \times n^2 + k_2 \times n^3$$

Periodica

$$E = E_0 + p \times n + k \times \sin(\alpha \times n + \varphi)$$

Esempio di calcolo:

$$O = 2.453.969,6927 \text{ (valore Osservato)}$$

$$E = 2.453.678,2321 \text{ (Epoca)}$$

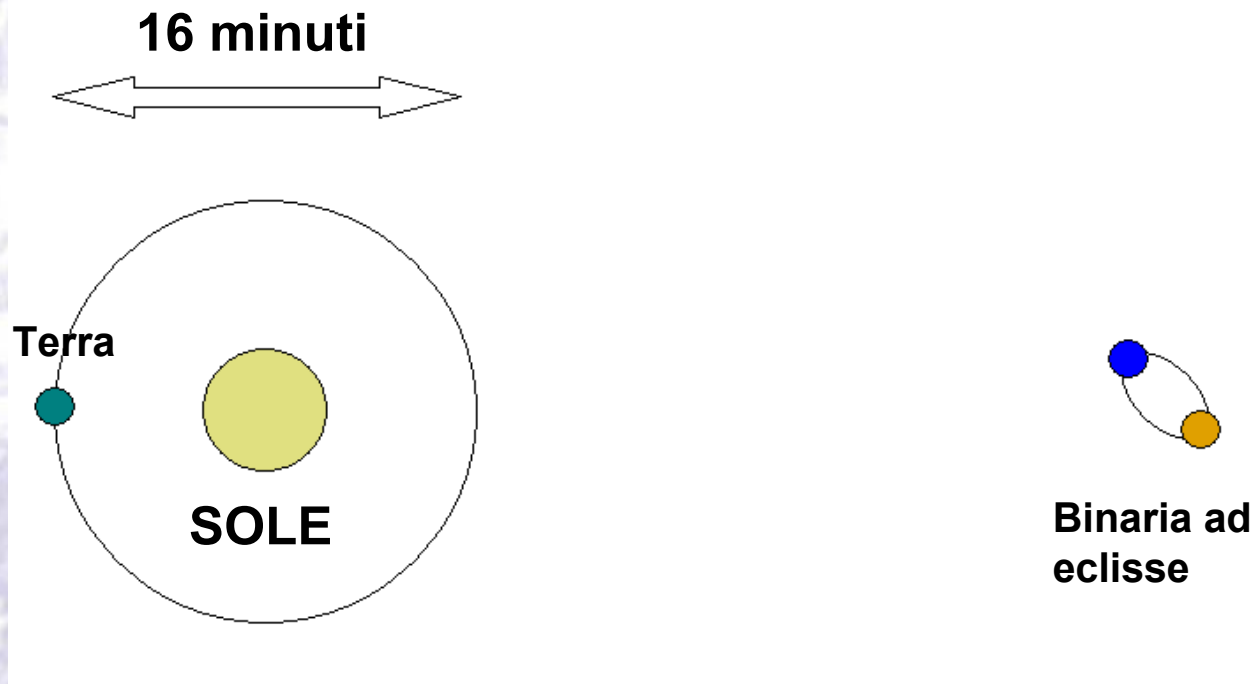
$$N = 1.240 \text{ cicli}$$

$$P = 0,234827 \text{ (Periodo)}$$

$$C = 2.453.678,2321 + 1.240 \times 0,234827$$

$$O-C = 0,2651 \text{ (frazione di giorno)}$$

Correzione eliocentrica (HJD)



$$H_{corr} = 0^d.0057 \times R \times \cos \beta \times \cos(L - \lambda)$$

R = raggio orbita terrestre

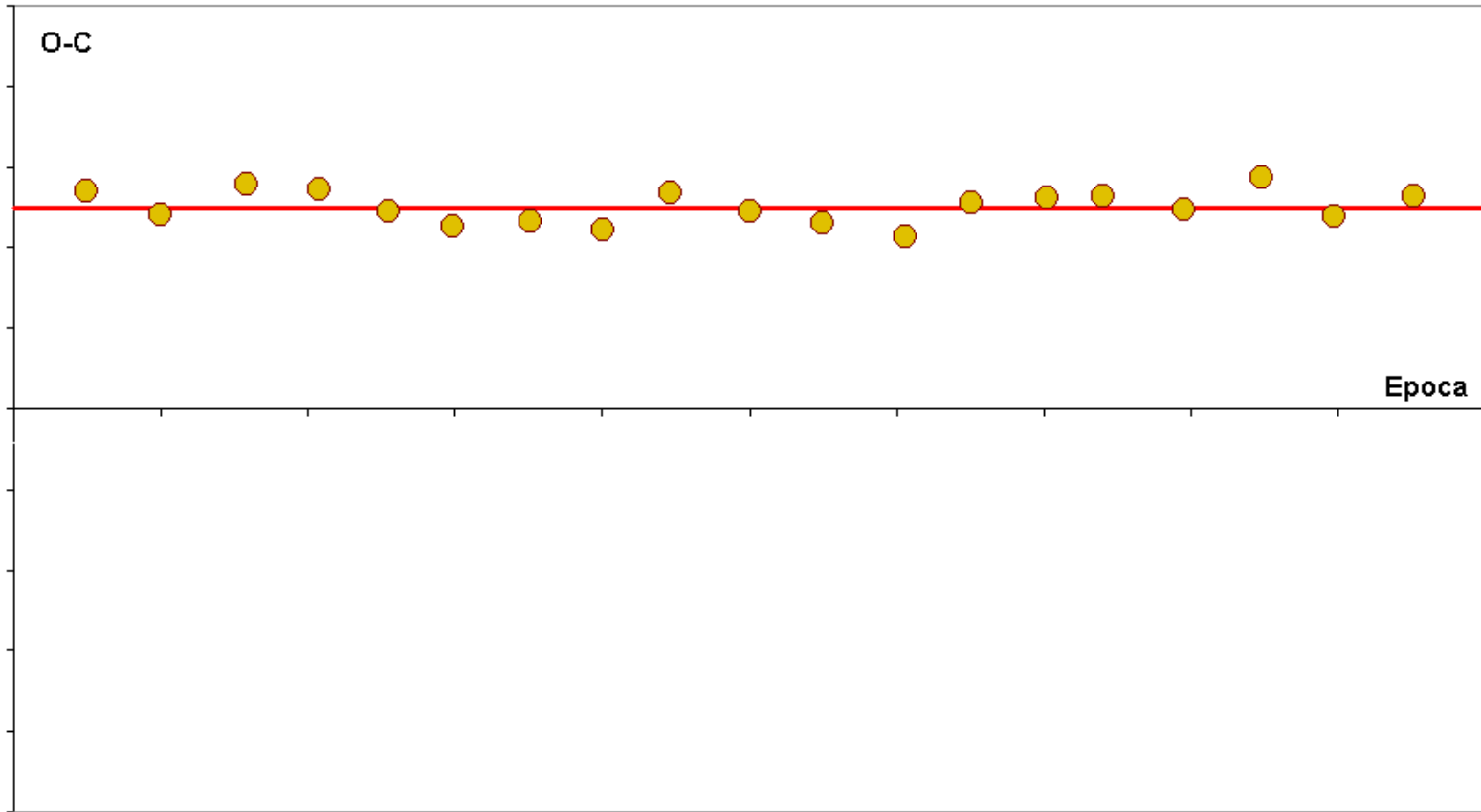
λ, β coordinate eclittiche della stella

L = longitudine media del Sole

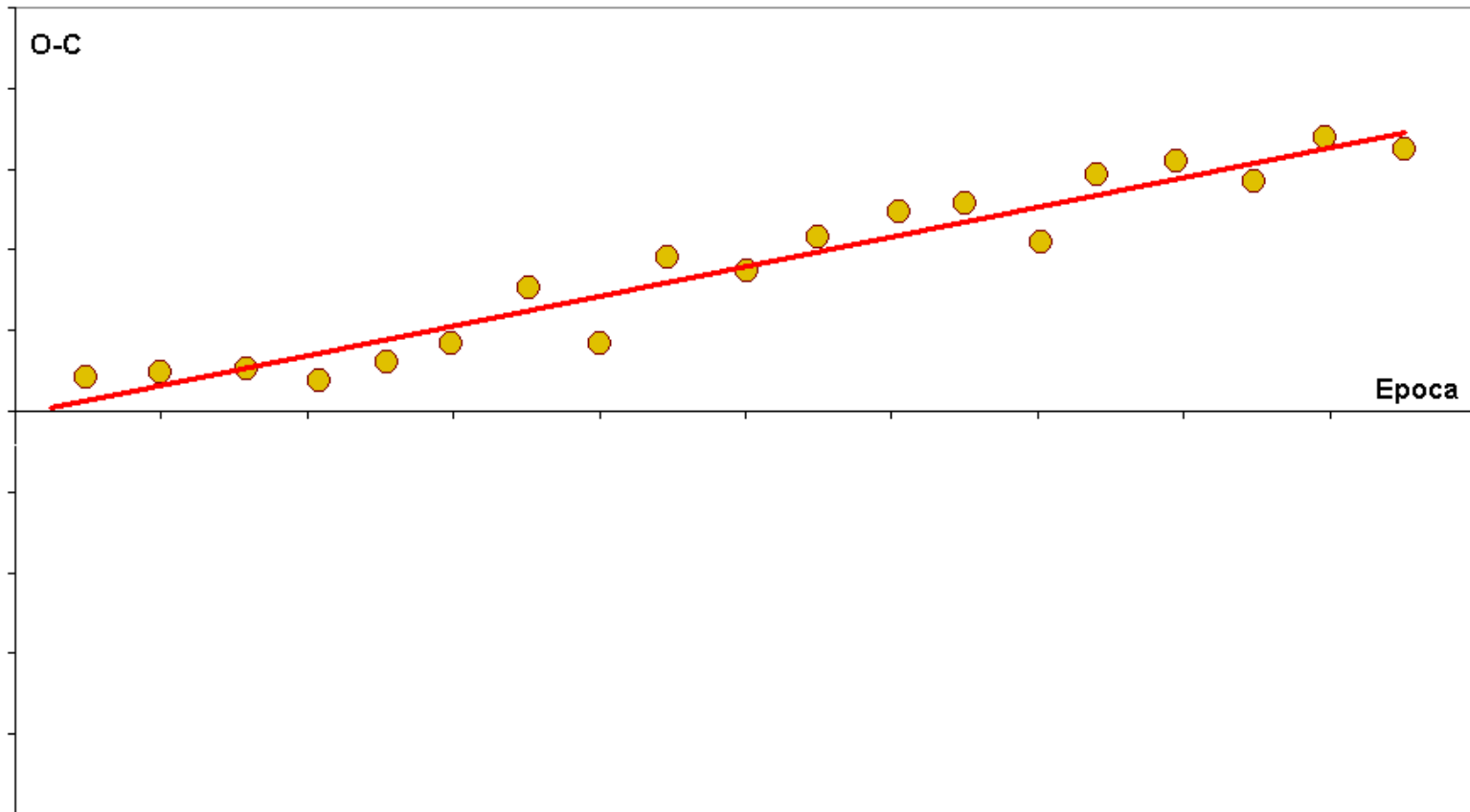
Epoca corretta - Periodo corretto



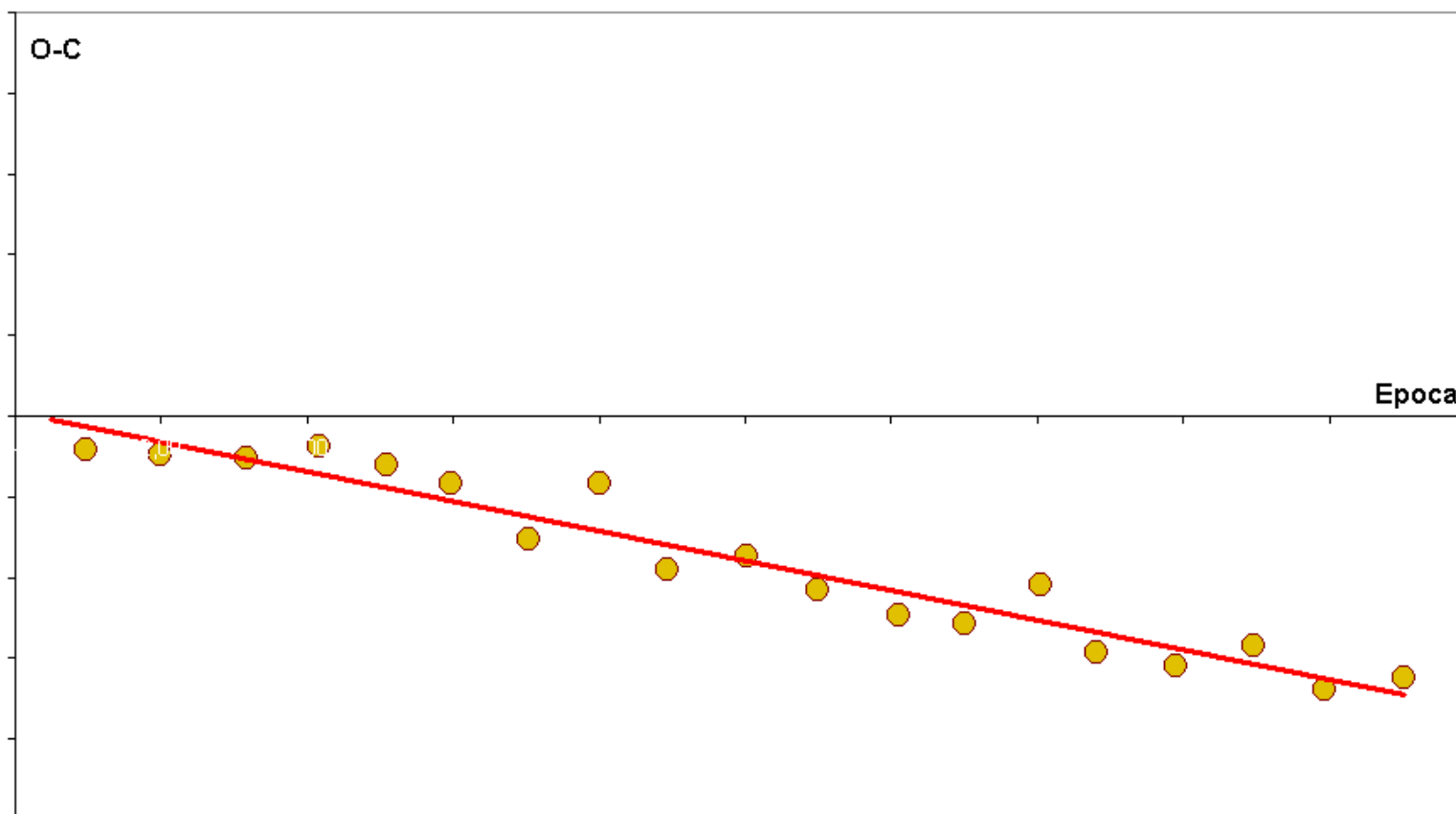
Epoca errata – Periodo corretto



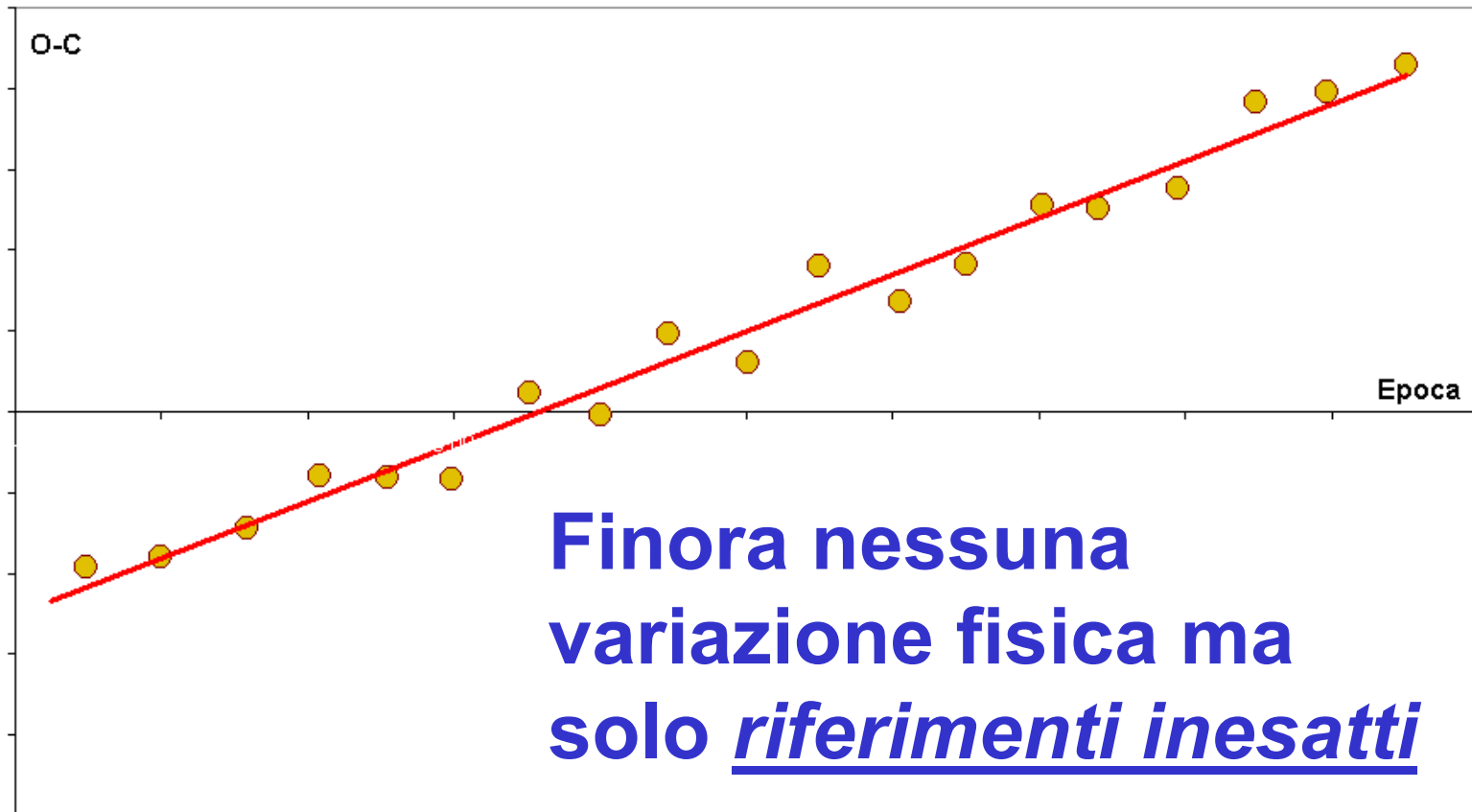
Epoca corretta – Periodo più breve



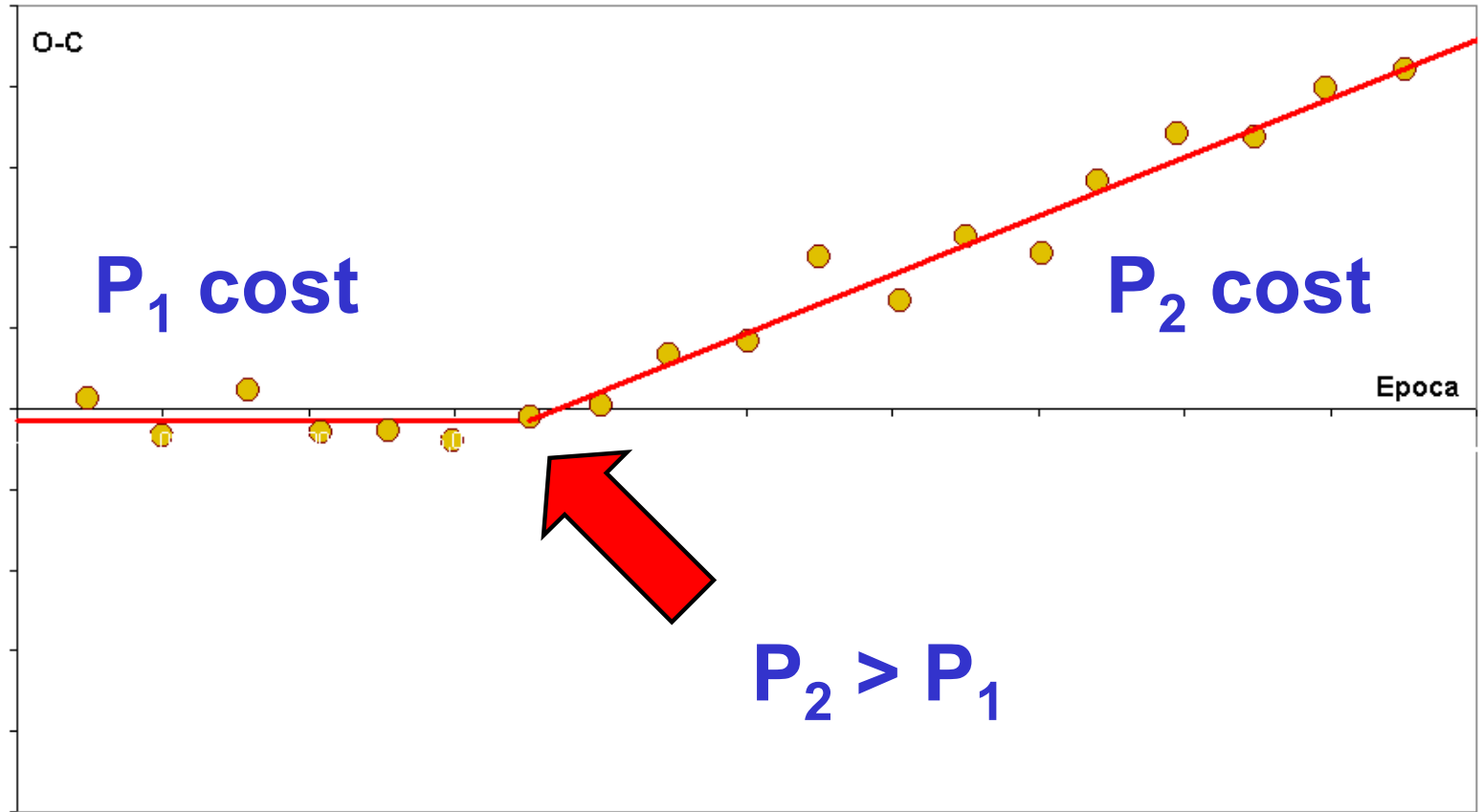
Epoca corretta – Periodo più lungo



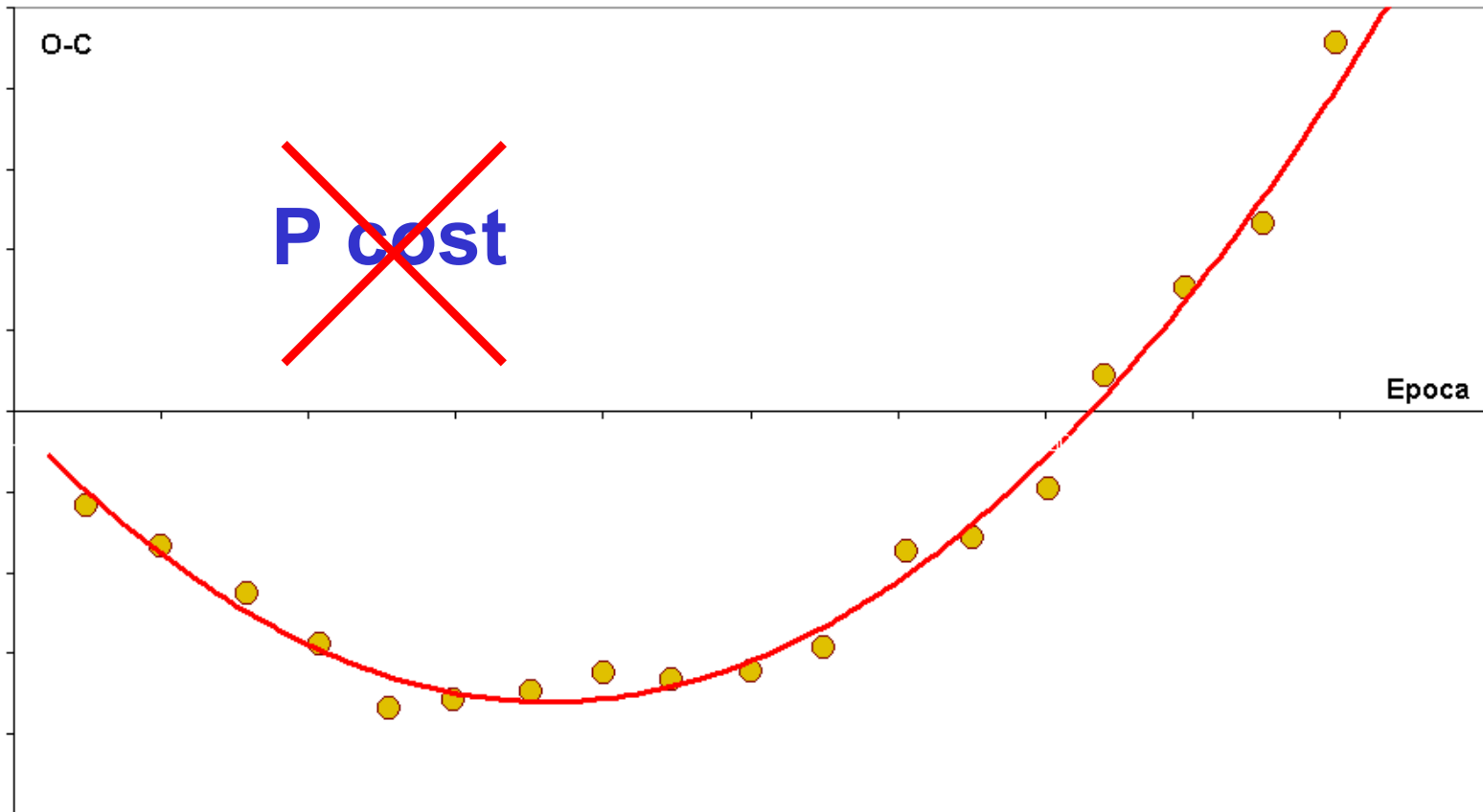
Epoca errata – Periodo più breve



Epoca corretta – Cambio periodo (più breve)



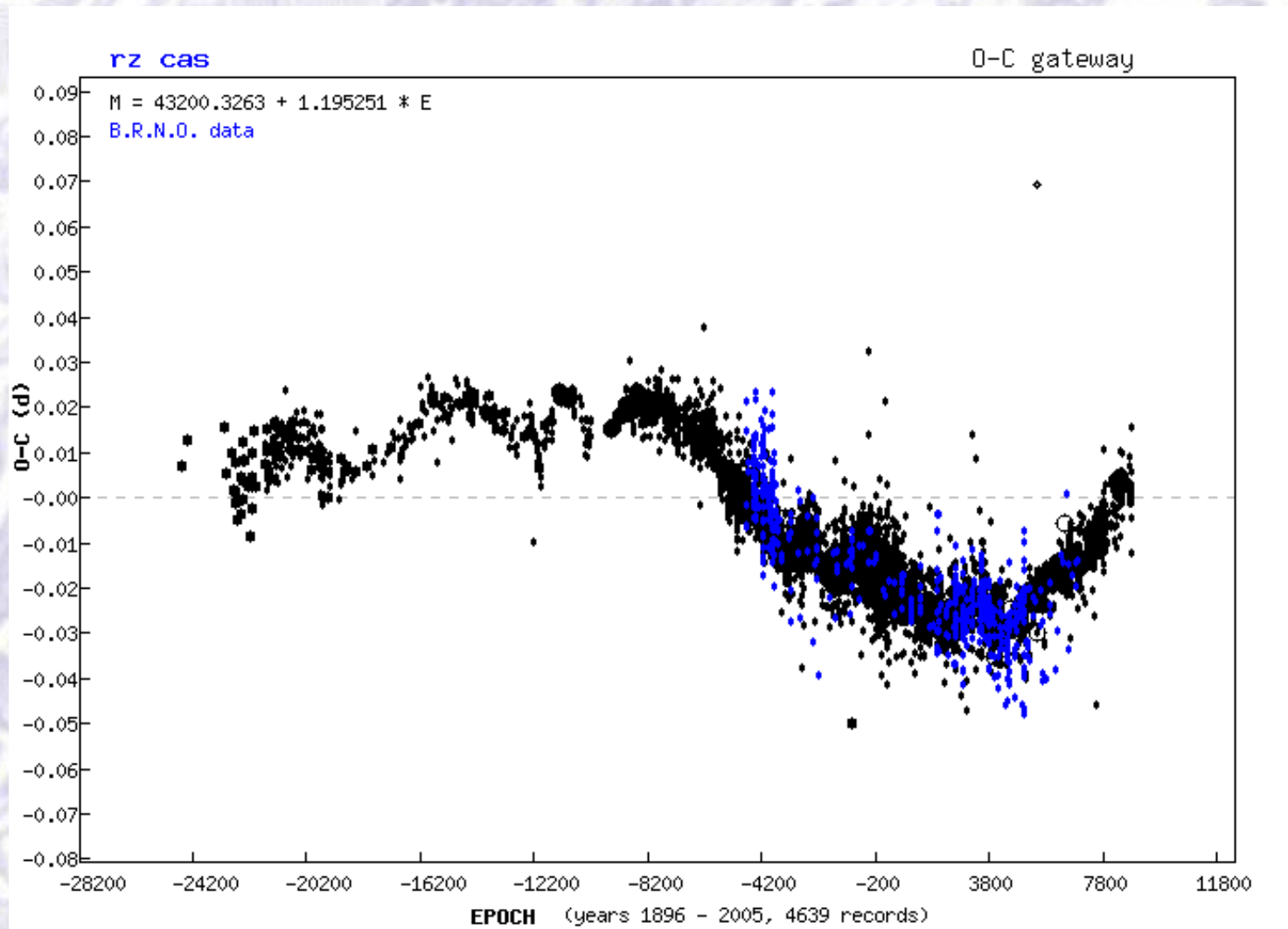
Epoca corretta – Periodo aumenta linearmente



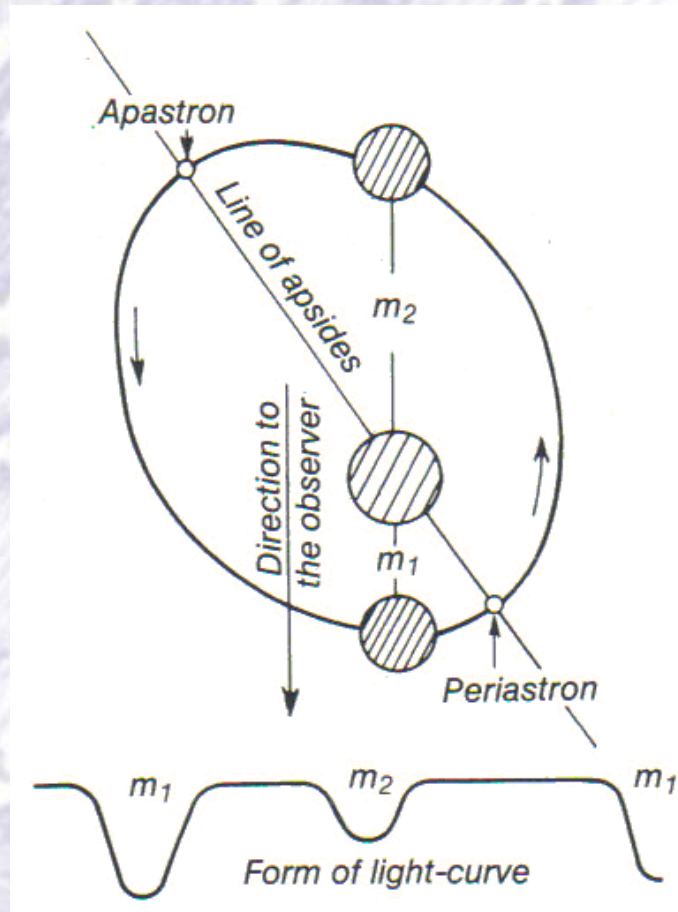
Periodo diminuisce linearmente



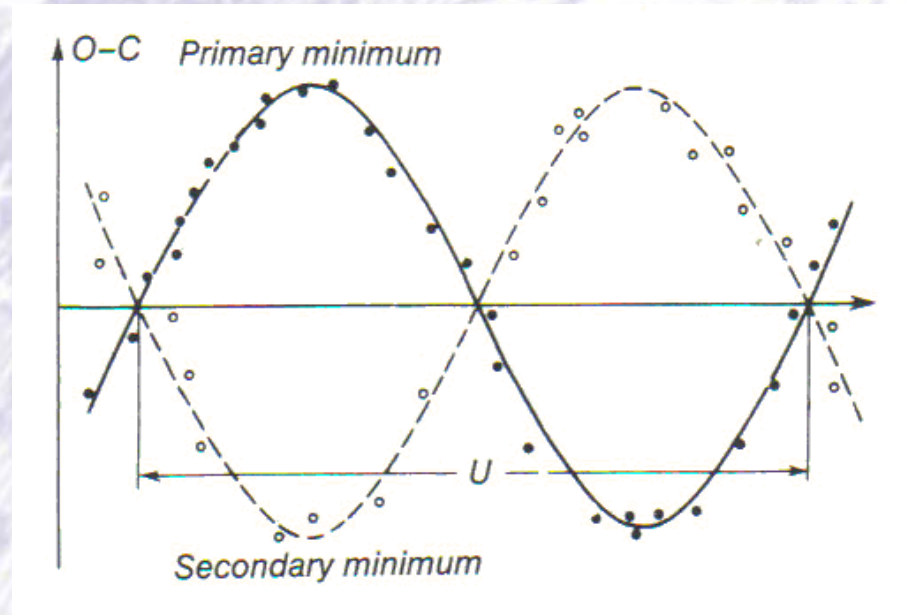
I residui O-C sono irregolari



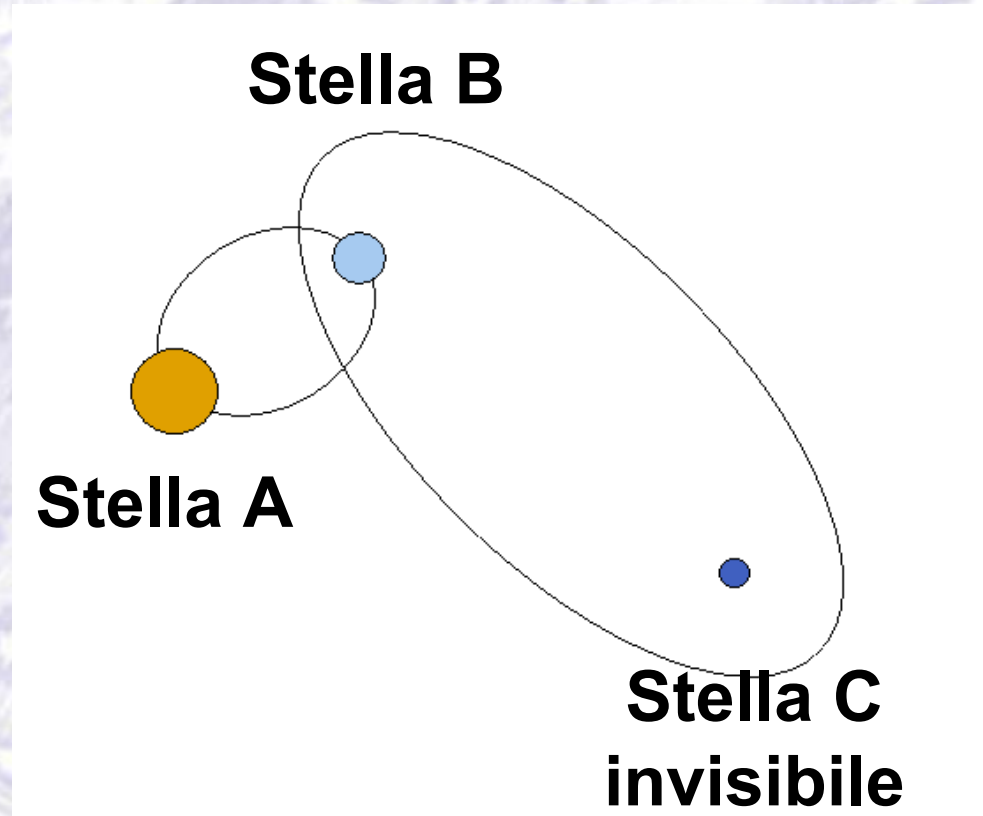
Rotazione della linea degli apsi



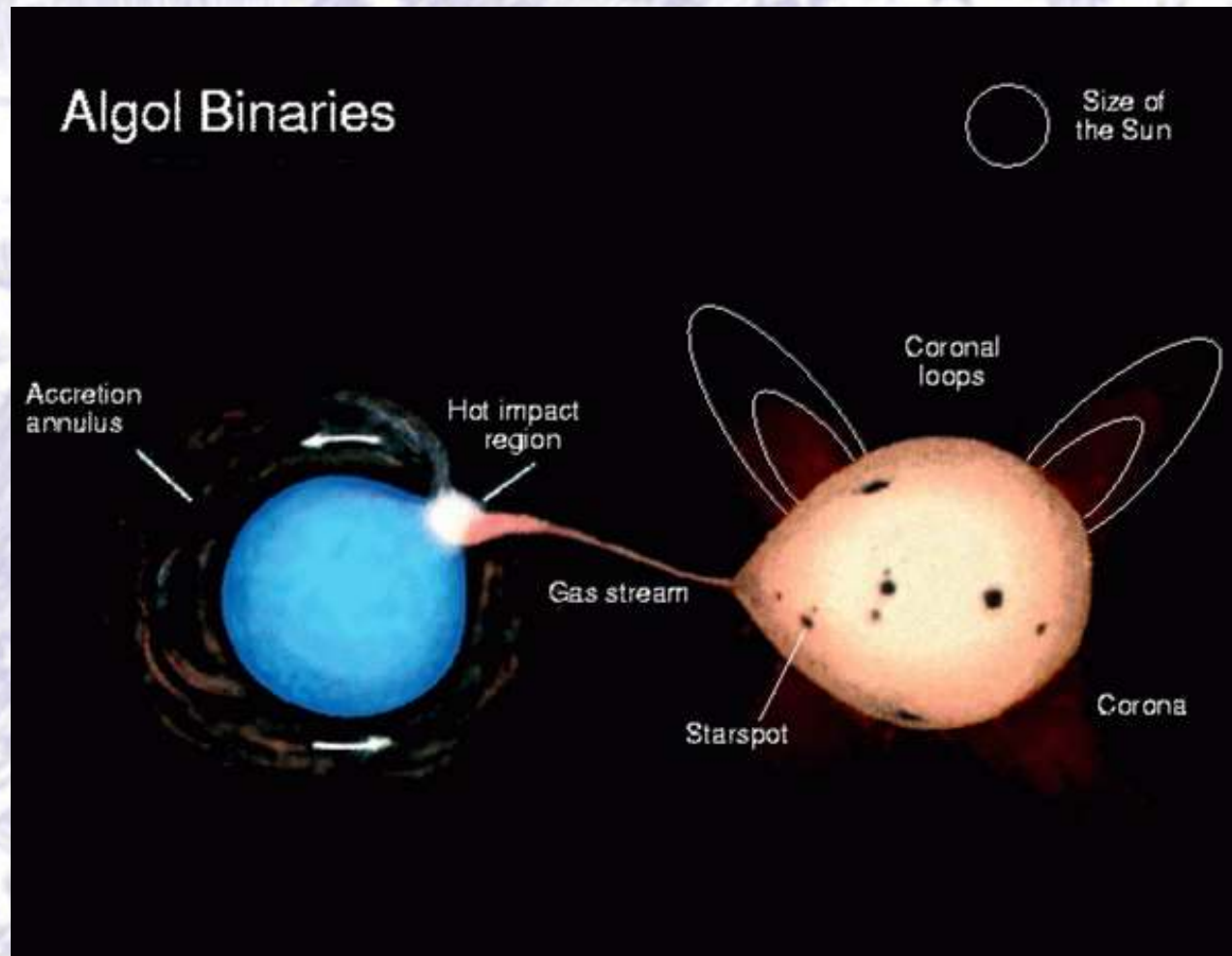
Rotazione della linea degli apsidi



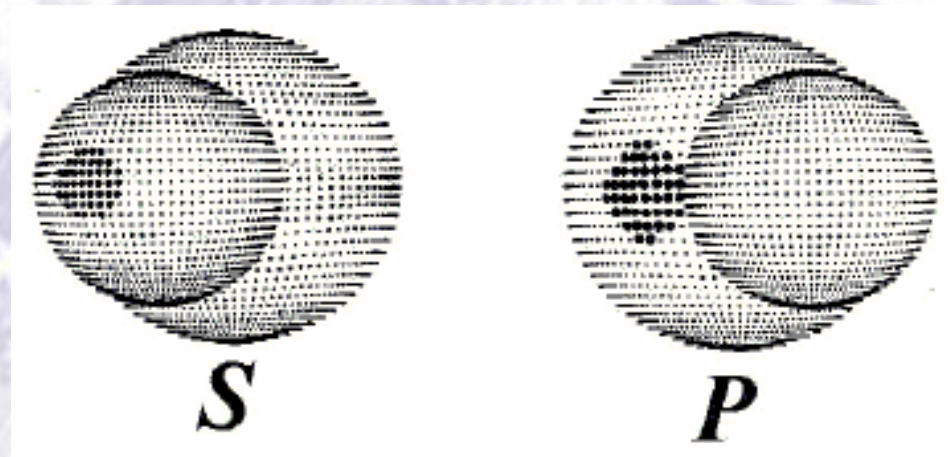
Sistema multiplo con compagna invisibile



Scambio di massa

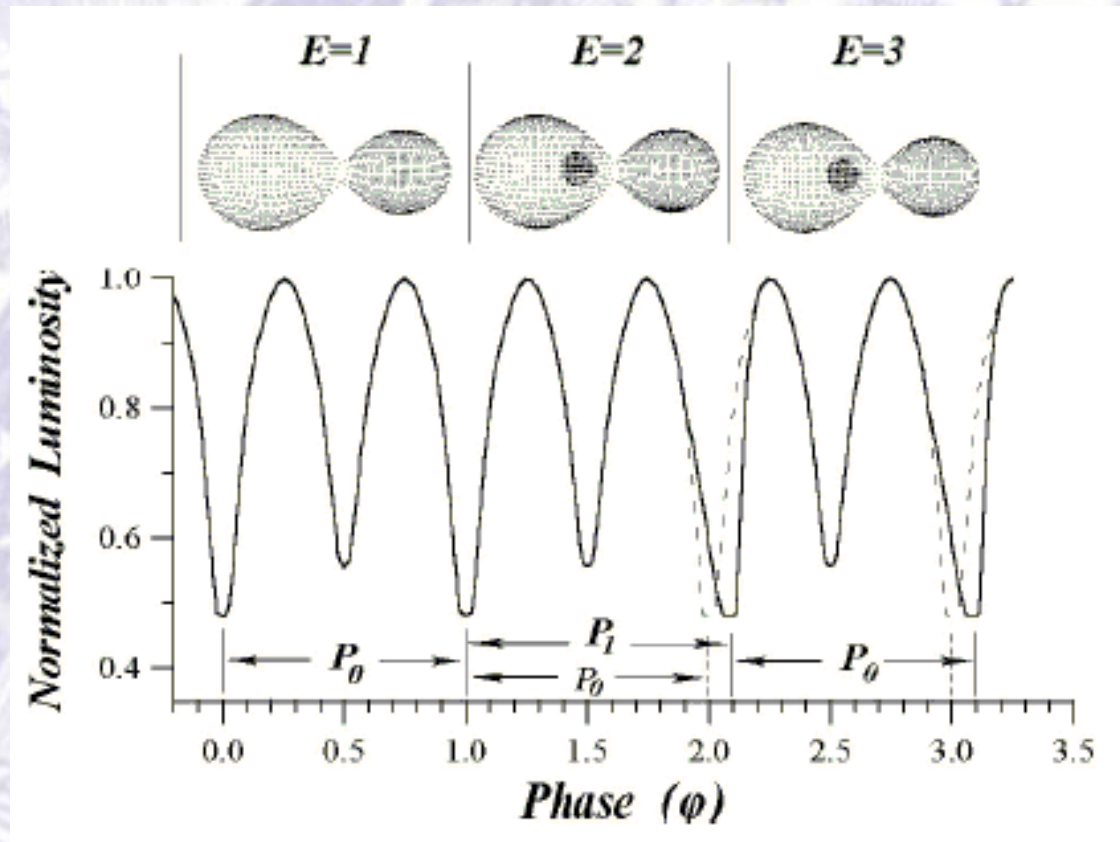


Presenza di “macchie” stellari (Starspot theory)

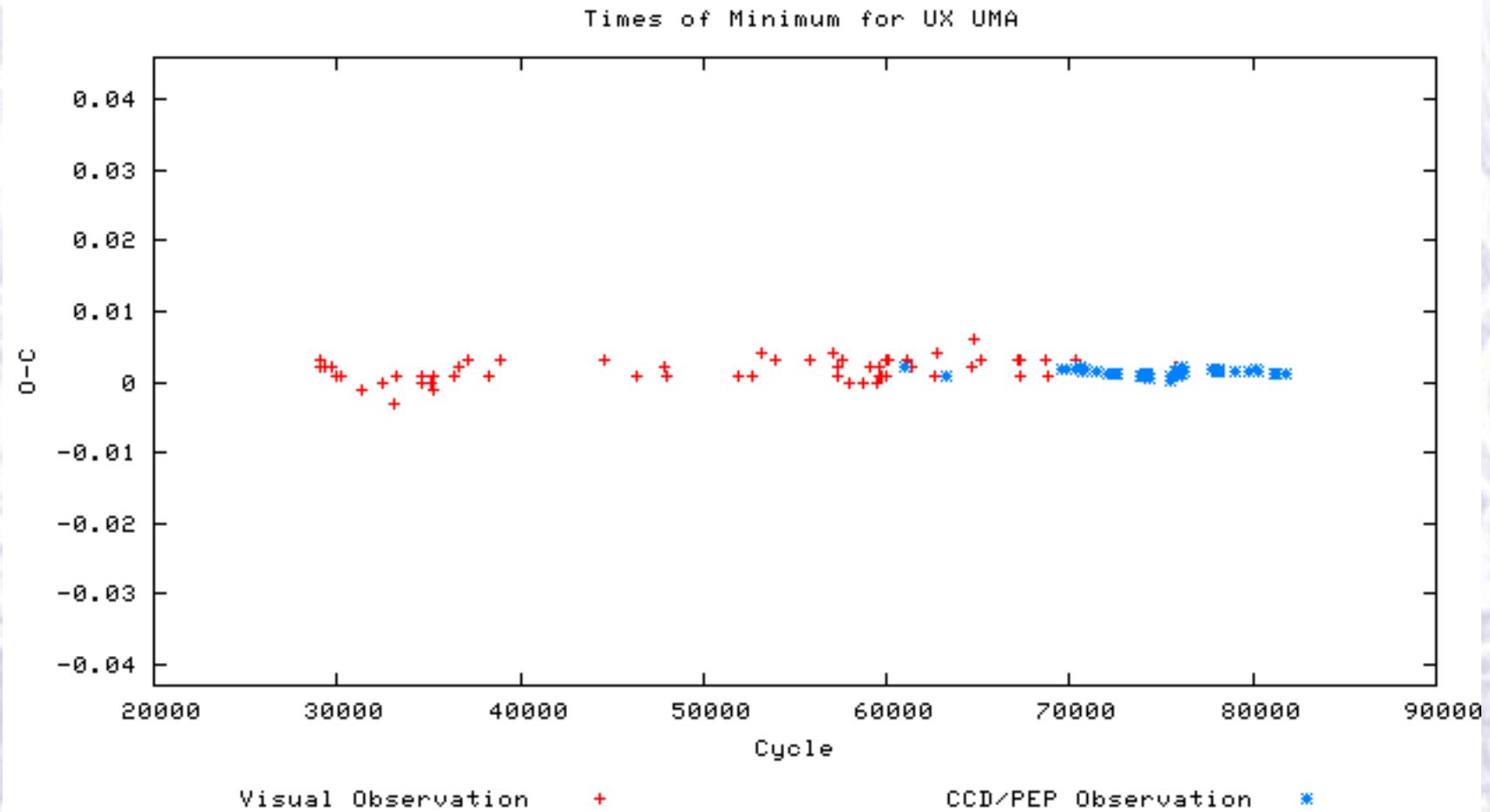


Comparsa di macchie con cadenza quasi-periodica legata a variazioni del campo magnetico

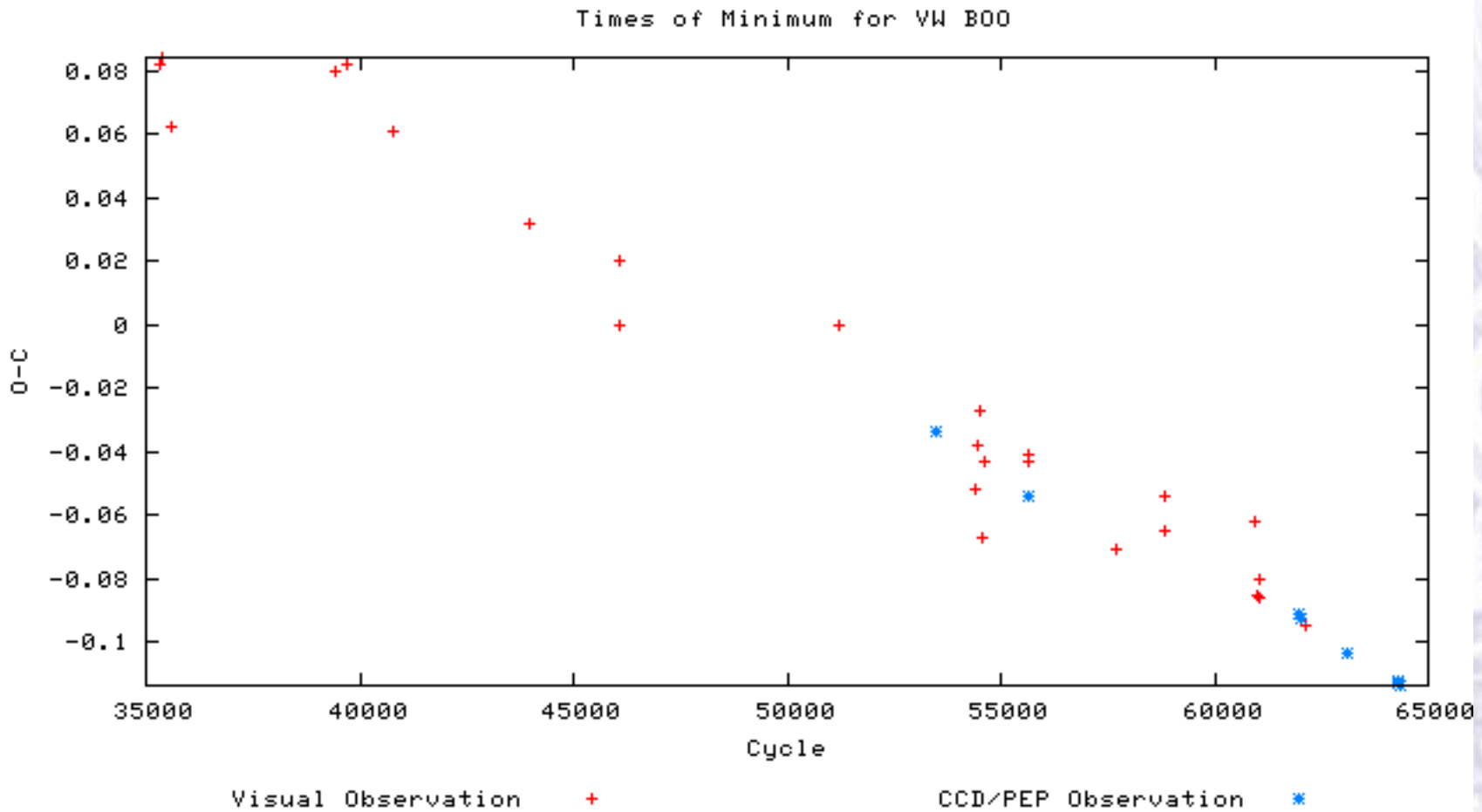
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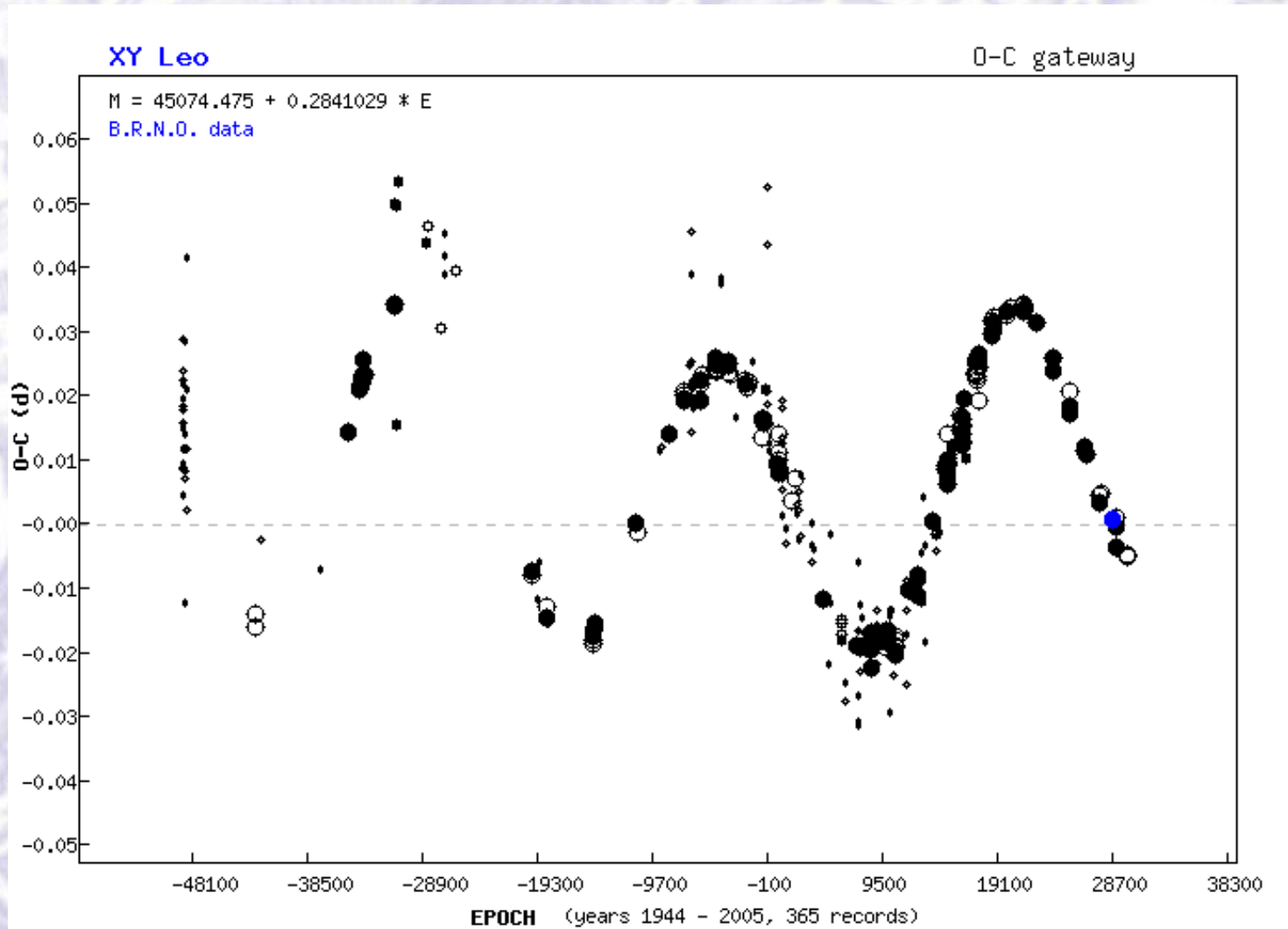
Esempio 1: UX UMa



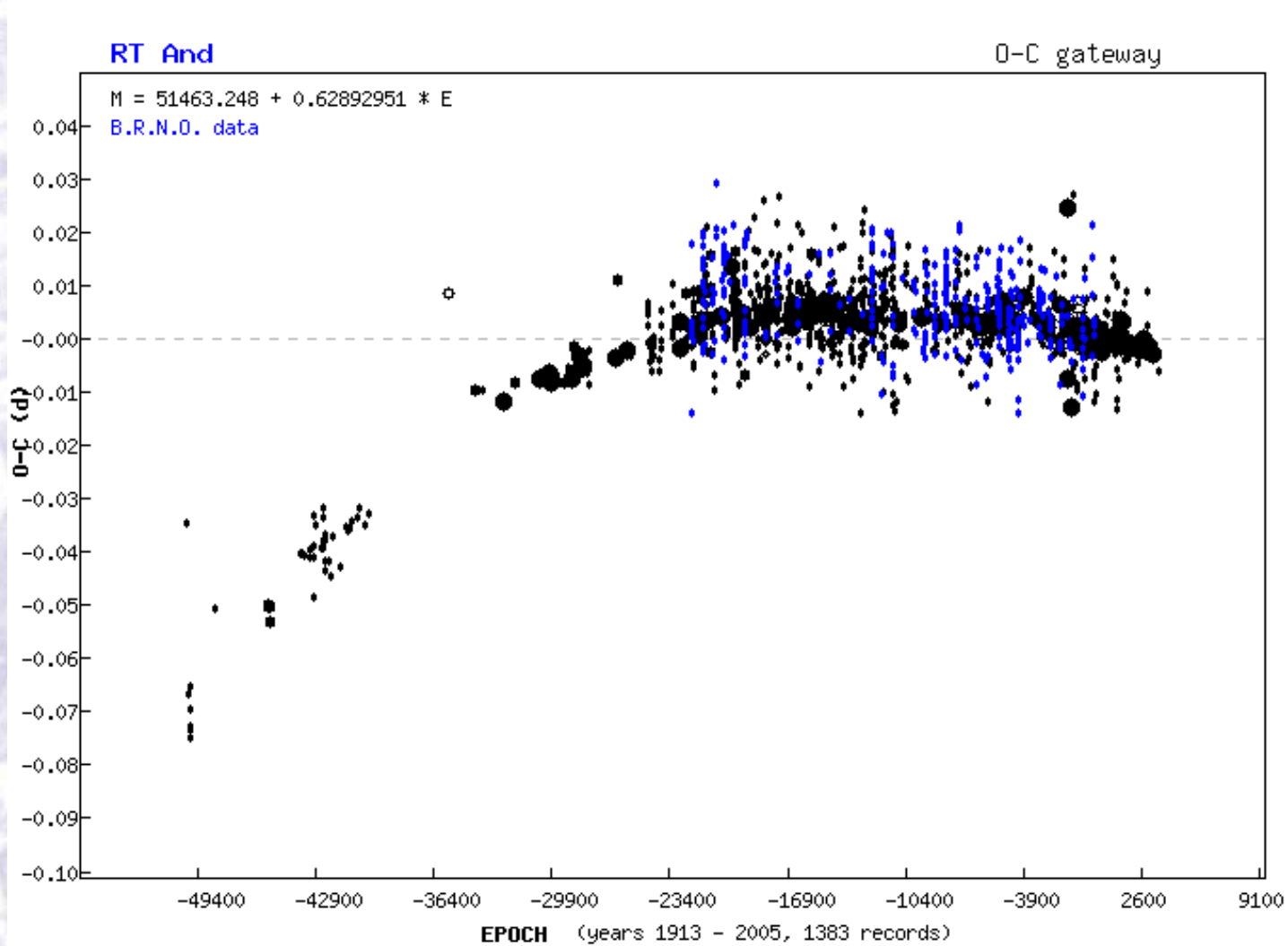
Esempio 2: VW Boo



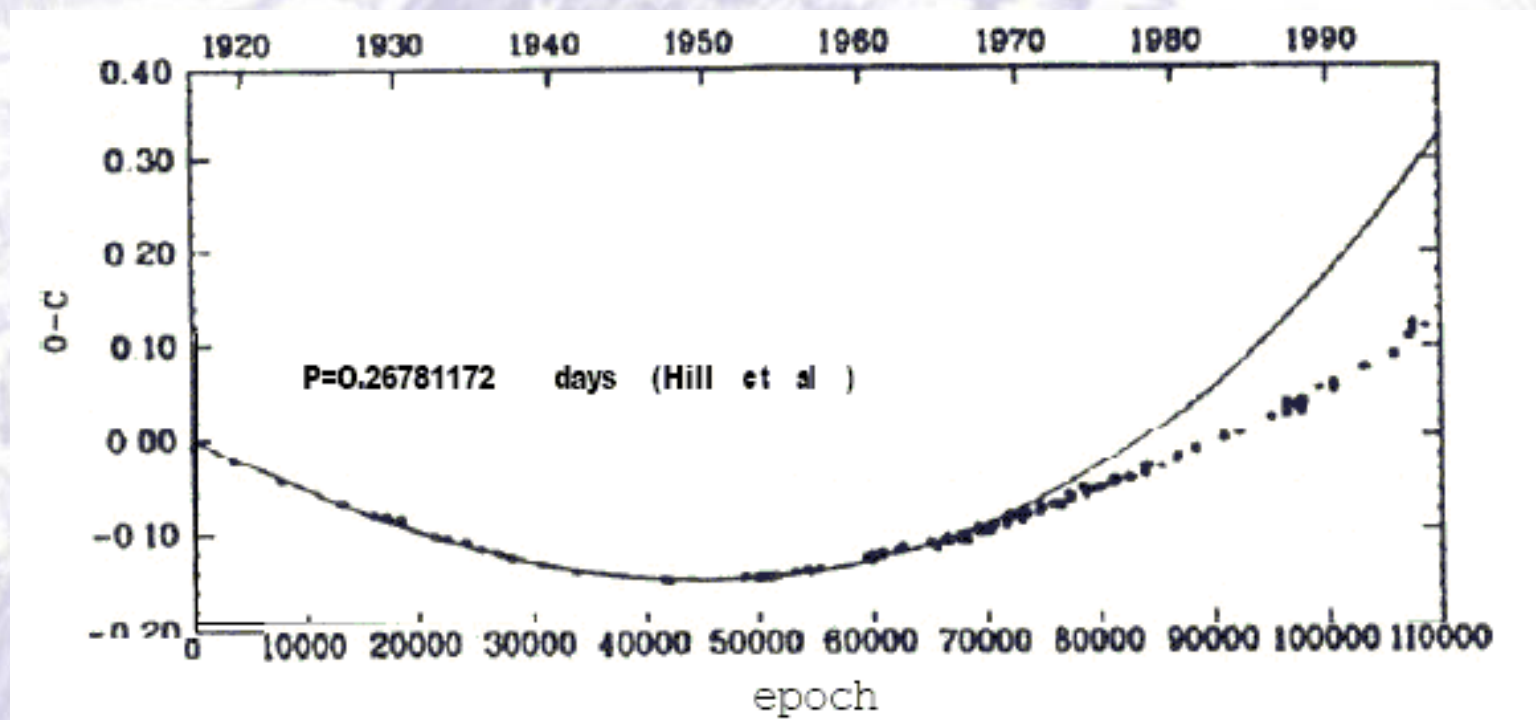
Esempio 3: XY Leo



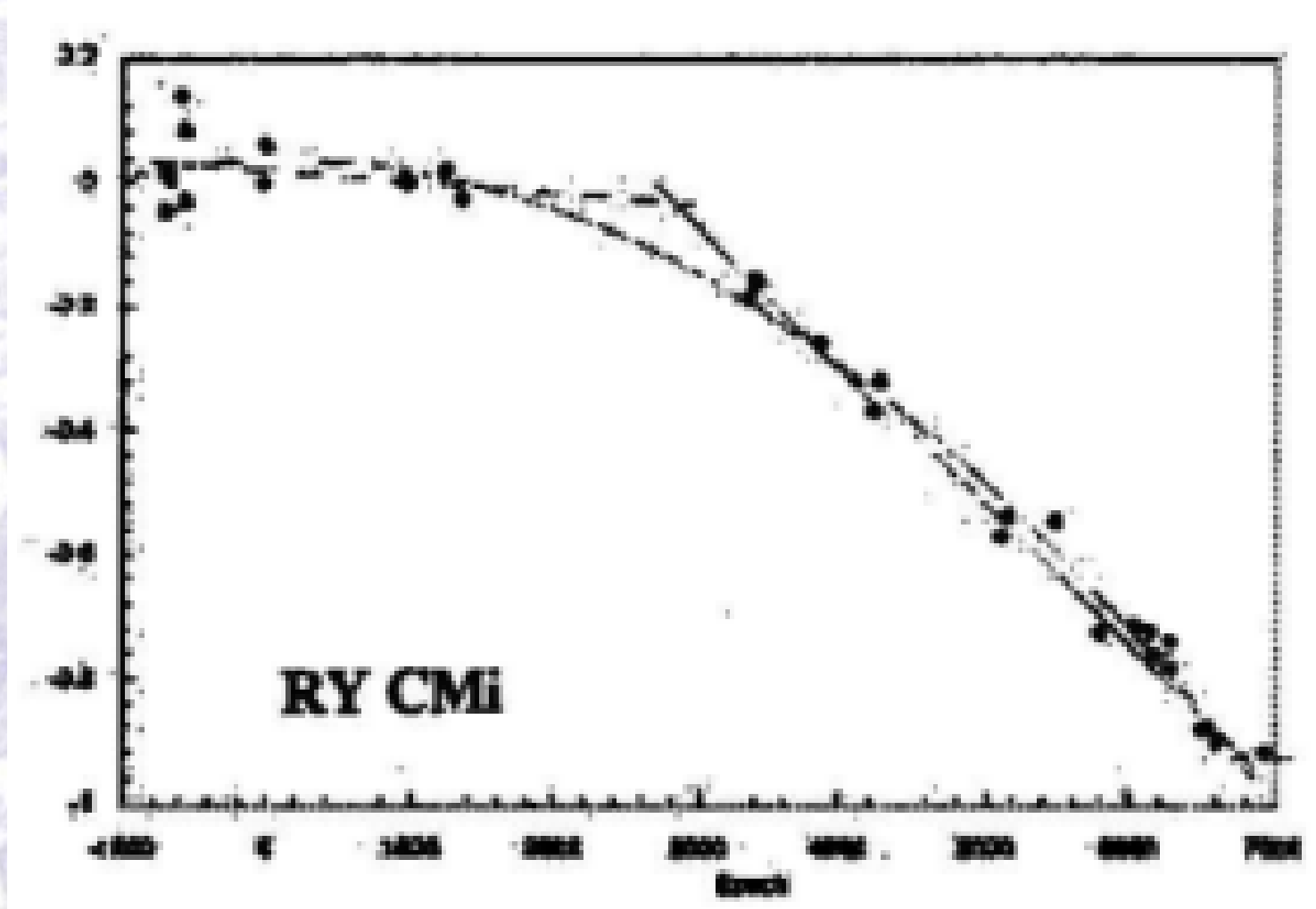
Esempio 5: RT And



Esempio 7: 44 Boo



Esempio 11: HW Vir



SZ Lyn: una rara RR Lyrae ad eclisse

