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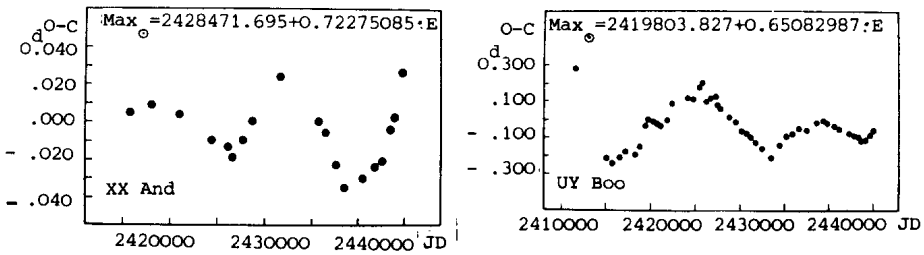
CYCLIC VARIATIONS OF THE PERIODS OF RR LYRAE TYPE STARS

An investigation of the instability of the light variation period of RR Lyrae type stars has been carried out at Odessa Astronomical Observatory. From the investigated stars a group of objects could be distinguished for which the presence of cyclicity in the variations of periods is inherent. It was shown that the cyclicity observed is not due to the binary nature of the objects studied.

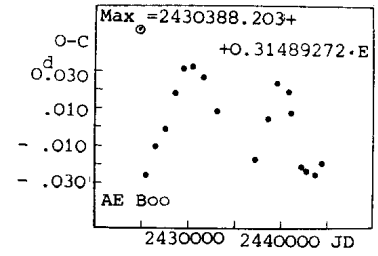
It has been supposed that the cyclicity in the variations of the periods of RR Lyrae stars is caused by two different limited states of stars. The nature of the internal mechanism which maintains the cyclic variations of the periods is probable associated with variations in stellar structure. (Firmanyuk, 1980; Astron. Circ. No. 1118)

Cepheids, Mira-, RV Tauri- and eclipsing stars show cyclic variations in their periods as well.

At present the model of the mechanism maintaining cyclicity in the periods of light variations of RR Lyrae stars has not yet been constructed. The nature of cyclicity in the variations of the periods of variable stars of other types is not clear either. Now it looks worth presenting the O-C diagrams of some RR Lyrae type stars showing cyclic period changes.



Figures 1-2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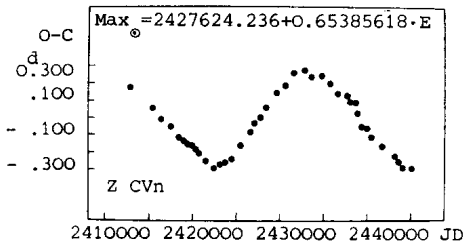
O-C
0.030
.010
- .010
- .030
AE Boo
2430000 2440000 JD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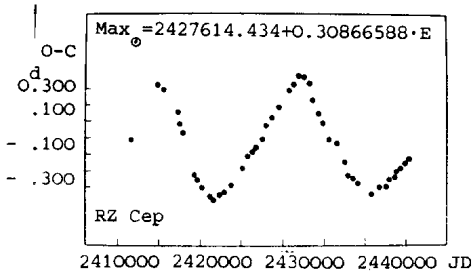
O-C
0.300
.100
- .100
- .300
Z CVn
2410000 2420000 2430000 2440000 JD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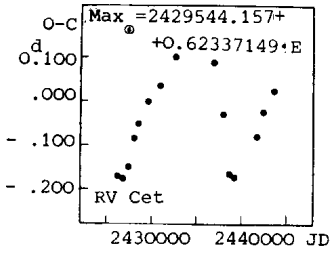
.100
- .100
- .300
RZ Cep
2410000 2420000 2430000 2440000 JD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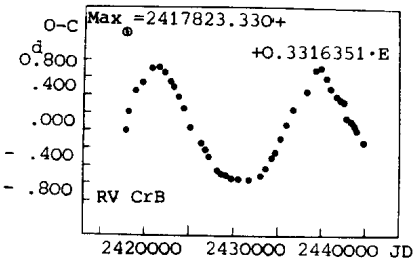
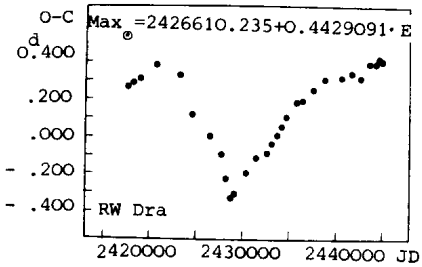
+0.62337149·E
O-C
0.100
.000
- .100
- .200
RV Cet
2430000 2440000 JD


Max =2417823.330+
+0.3316351·E
O-C
0.800
.400
.000
- .400
- .800
RV CrB
2420000 2430000 2440000 JD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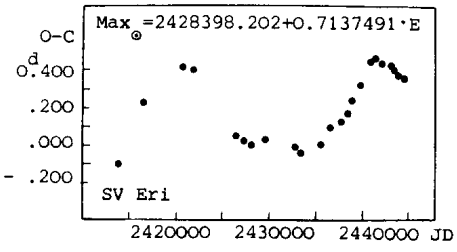
O-C
0.400
.200
.000
- .200
- .400
RW Dra
2420000 2430000 2440000 JD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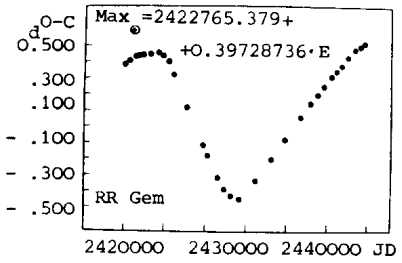
O-C
0.400
.200
.000
- .200
SV Eri
2420000 2430000 2440000 JD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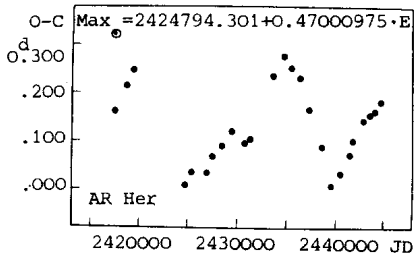
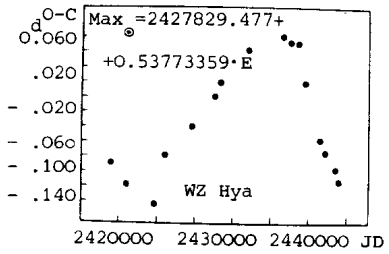
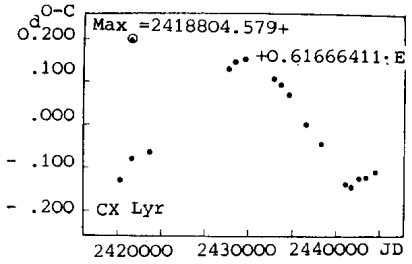
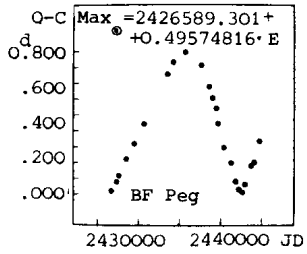
O-C
0.500
.300
.100
- .100
- .300
- .500
RR Gem
2420000 2430000 2440000 JD

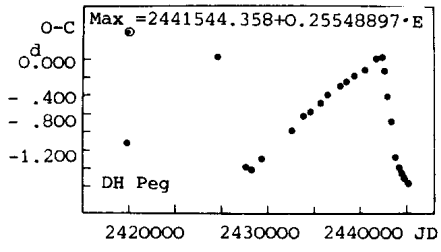
Figures 3-10

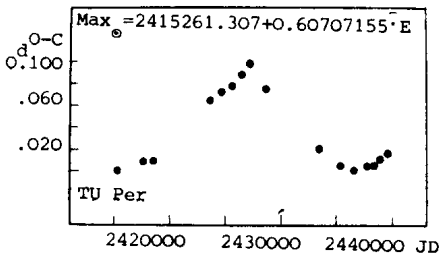


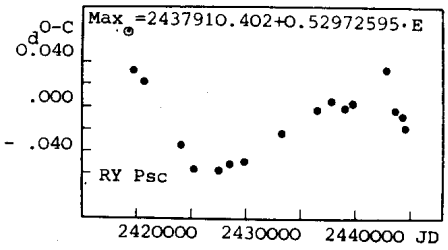


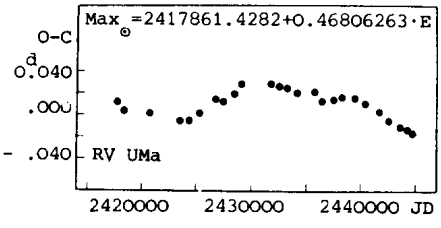












Figures 11-18

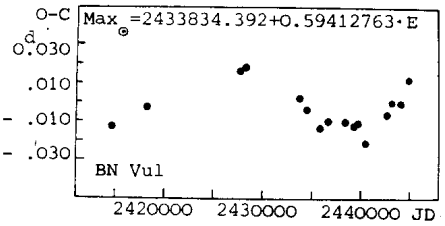


Figure 19

The elements of these RR Lyrae stars are given below:

Table

Star	Elements	Number of cycles
XX And	$Max_{\odot}$ JD = 2428471.695 + 0^{d}.72275085 E	13000
UY Boo	$Max_{\odot}$ JD = 2419803.827 + 0.65082987 E	14000
AE Boo	$Max_{\odot}$ JD = 2430388.203 + 0.31489272 E	10000
Z CVn	$Max_{\odot}$ JD = 2427624.236 + 0.65385618 E	22000
RZ Cep	$Max_{\odot}$ JD = 2427614.434 + 0.30866588 E	18000
RV Cet	$Max_{\odot}$ JD = 2429544.157 + 0.62337149 E	12500
RV CrB	$Max_{\odot}$ JD = 2417823.330 + 0.3316351 E	18500
RW Dra	$Max_{\odot}$ JD = 2426610.235 + 0.4429091 E	23000
SV Eri	$Max_{\odot}$ JD = 2428398.202 + 0.7137491 E	22000
RR Gem	$Max_{\odot}$ JD = 2422765.379 + 0.39728736 E	27500
AR Her	$Max_{\odot}$ JD = 2424794.301 + 0.47000975 E	14500
WZ Hya	$Max_{\odot}$ JD = 2427829.477 + 0.53773359 E	28000
CX Lyr	$Max_{\odot}$ JD = 2418804.579 + 0.61666411 E	28000
BF Peg	$Max_{\odot}$ JD = 2426589.301 + 0.49574816 E	16000
DH Peg	$Max_{\odot}$ JD = 2441544.358 + 0.25548897 E	16500
TU Per	$Max_{\odot}$ JD = 2415261.307 + 0.60707155 E	22000
RY Psc	$Max_{\odot}$ JD = 2437910.402 + 0.52972595 E	23000
RV UMa	$Max_{\odot}$ JD = 2433834.392 + 0.59412763 E	24000
BN Vul	$Max_{\odot}$ JD = 2417861.4282 + 0.46806263 E	25000

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