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# NEW EPHEMERIDES OF RR LYRAE STARS

ABSTRACT

   Here are new updated ephemerides for 65 variable stars of types RRab and RRc.  The aim is to make easier the work of astronomers observing or studying these stars.

RÉSUMÉ

   Voici de nouvelles ephemerides de 65 variables de types RRab et RRc, mises à jour afin de faciliter le travail des observateurs et de ceux qui étudient ces étoiles.

RIASSUNTO

   Le effemeridi di 65 variabili di tipo RRab e RRc sono state aggiornate allo scopo di facilitare sia nuove osservazioni che l'analisi delle vecchie.

RESUMEN

   Se publican nuevas efemérides de 65 estrellas variables de los tipos RRab o RRc con objeto de facilitar el trabajo de los observadores o de los que estudian dichas estrellas.

INTRODUCTION

   To forecast observations of RR Lyrae stars or to publish the time of maxima of such a star, the ephemerides of the GCVS 85 are still often used.  However, those data are not always very accurate and some of them are no more valuable because the period of a large part of those variable stars is changing slowly or abruptly with time.  The numerous times of maxima listed in the GEOS RR Lyrae database (http://dbRR.ast.obs-mip.fr) gives the possibility to calculate new and better elements of the period of a lot of RR Lyrae stars.  That has already been made and published (Le Borgne et al., 2007) for RRab variables with data covering at least 50 years and for which the period was found to be constant or varying at a constant rate.  Here we publish new ephemerides for RRab with an irregular period.  A lot of the O-C graphics of those stars have still been showed in Le Borgne et al. (2007).  We are also giving the new elements of period for RRab and RRc Lyrae stars with data covering only less than 40 years for RRab and less than 30 years for RRc stars, but only if the GCVS 85 ephemerides have to be improve and when new data allow it.

NOTES

   In the last column of Table 1, we give the general trend of the pulsating period of each star during the time covered by the data.  We want to call attention of the fact that this is noted only to help the user of the ephemerides and that this must be taken with care when there are few times of maxima and large gaps without data.  We recommend to go to and see in the GEOS database (http://dbRR.ast.obs-mip.fr) the value of the last maximum in case of irregular periods.

REFERENCES

- Kholopov, P.N., et al., 1985, General Catalogue of Variable Stars
- Le Borgne J.F. et al., 2007, A&A, 476 n° 1, 307

Table 1 : new ephemerides of some RRab and RRc stars

| Star | Type | N max | Time cov (years) | Epoch (HJD 24000+) | Period (d) | s.d. | Notes |
|---|---|---|---|---|---|---|---|
| HK And | RRab | 27 | 30 | 40825.5442 (±0.008) | 0.51012124 (±0.000002) | 0.0390 | constant period, large gab without data |
| IT And | RRab | 24 | 3 | 40827.5159 (±0.006) | 0.57732844 (±0.000011) | 0.0299 | constant period |
| IY And | RRab | 30 | 29 | 40811.5135 (±0.002) | 0.48542596 (±0.0000004) | 0.0117 | constant period, large gab without data |
| GG Aqr | RRab | 29 | 36 | 45226.4557 (±0.006) | 0.65564617 (±0.000001) | 0.0329 | constant period |
| GP Aqr | RRab | 10 | 8 | 52009.0132 (±0.003) | 0.40525376 (0.000001) | 0.0087 | constant period |
| UY Boo | RRab | 171 | 117 | 41835.9299 (±0.017) | 0.65084370 (±0.000001) | 0.2192 | irregular period |
| AM Boo | RRab | 20 | 37 | 37668.5504 (±0.005) | 0.46438011 (±0.0000008) | 0.0300 | constant period, large gab without data |
| BB Boo | RRab | 27 | 22 | 37823.4638 (±0.003) | 0.47275234 (±0.0000005) | 0.0174 | constant period, large gab without data |
| BQ Boo | RRab | 20 | 37 | 37669.5023 (±0.010) | 0.62031265 (±0.000002) | 0.0454 | constant period, large gab without data |
| U Cae | RRab | 32 | 18 | 34314.5568 (±0.002) | 0.41979257 (±0.0000007) | 0.0112 | constant or decreasing period, large gab without data |
| EF Cnc | RRc | 65 | 24 | 51955.5214 (±0.002) | 0.29578071 (±0.0000002) | 0.0167 | constant period, large gab without data |
| EZ Cnc | RRab | 78 | 25 | 47153.6965 (±0.001) | 0.54578251 (±0.0000002) | 0.0090 | constant period |
| Z CVn | RRab | 120 | 95 | 38931.0989 (±0.019) | 0.65384794 (±0.0000009) | 0.2081 | irregular period |
| RU CVn | RRab | 90 | 97 | 34483.4882 (±0.002) | 0.57324989 (±0.00000007) | 0.0158 | irregular period |
| RZ CVn | RRab | 57 | 81 | 40343.7709 (±0.003) | 0.56740647 (±0.0000003) | 0.0238 | irregular period |
| UZ CVn | RRab | 203 | 106 | 15423.9883 (±0.005) | 0.69778739 (±0.0000003) | 0.0648 | irregular period |
| VW CVn | RRc | 40 | 105 | 19486.2709 (±0.008) | 0.42498597 (±0.0000004) | 0.0487 | irregular period |
| GI CMa | RRab | 21 | 35 | 38739.5106 (±0.010) | 0.45223697 (±0.000002) | 0.0468 | constant period, large gab without data |
| TX Car | RRab | 21 | 14 | 24567.1693 (±0.0009) | 0.60112377 (±0.0000005) | 0.0039 | constant period |
| V 363 Cas | RRab | 54 | 90 | 36142.5585 (±0.008) | 0.54655206 (±0.0000005) | 0.0570 | irregular period |
| RZ Cep | RRc | 387 | 117 | 42635.5334 (±0.008) | 0.30866536 (±0.0000002) | 0.1576 | irregular period |
| ET Cep | RR: | 30 | 1 | 53708.5776 (±0.001) | 0.49921500 (±0.000003) | 0.0062 | constant period |
| RU Cet | RRab | 64 | 118 | 39826.4340 (±0.026) | 0.58628975 (±0.000001) | 0.2088 | irregular period |
| RX Cet | RRab | 124 | 117 | 40125.8515 (±0.007) | 0.57370019 (±0.0000004) | 0.0725 | irregular period, large gab without data |
| RY Com | RRab | 150 | 106 | 39598.8650 (±0.007) | 0.46895132 (±0.0000003) | 0.0498 | irregular period, large gab without data |
| HY Com | RRc | 34 | 96 | 44056.3804 (±0.014) | 0.44861117 (±0.0000006) | 0.0780 | irregular period |
| RV CrB | RRc | 264 | 100 | 42925.8629 (±0.026) | 0.33162921 (±0.0000009) | 0.4187 | irregular period |
| SW Cru | RRab | 28 | 7 | 26030.4277 (±0.0006) | 0.32778093 (±0.0000004) | 0.0029 | constant period |
| XZ Cyg | RRab | 1648 | 103 | 44124.9893 (±0.006) | 0.46657273 (±0.0000003) | 0.2481 | irregular period |
| V 759 Cyg | RRab | 70 | 106 | 35363.6912 (±0.034) | 0.36003189 (±0.000002) | 0.2832 | irregular period |
| V 783 Cyg | RRab | 57 | 28 | 41122.7697 (±0.002) | 0.62069583 (±0.0000008) | 0.0132 | constant period, large gab without data |
| V 801 Cyg | RRab | 54 | 28 | 42941.4574 (±0.001) | 0.51603885 (±0.0000004) | 0.0080 | constant period, large gab without data |

| Star | Type | N max | Time cov (years) | Epoch (HJD 24000+) | Period (d) | s.d. | Notes |
|---|---|---|---|---|---|---|---|
| V 1104 Cyg | RR | 20 | 24 | 38651.3512 (±0.005) | 0.43638149 (±0.0000006) | 0.0209 | constant period |
| V 1106 Cyg | RR | 31 | 23 | 38650.3901 (±0.005) | 0.40763835 (±0.0000007) | 0.0256 | constant period, large gab without data |
| RW Dra | RRab | 656 | 101 | 39377.3533 (±0.008) | 0.44291664 (±0.0000004) | 0.2007 | irregular period |
| VZ Dra | RRc | 289 | 45 | 43361.3900 (±0.001) | 0.32102744 (±0.0000001) | 0.0199 | irregular period |
| XZ Dra | RRab | 455 | 92 | 41928.3653 (±0.0009) | 0.47649521 (±0.00000006) | 0.0195 | irregular period |
| BC Dra | RRab | 58 | 21 | 42278.4159 (±0.0008) | 0.71958256 (±0.0000004) | 0.0059 | constant period |
| BK Dra | RRab | 279 | 108 | 25523.3386 (±0.002) | 0.59207786 (±0.0000001) | 0.0317 | irregular period |
| RR Gem | RRab | 279 | 108 | 41357.2979 (±0.018) | 0.39729382 (±0.0000005) | 0.3008 | irregular period |
| BG Gru | RRab | 23 | 35 | 36814.6204 (±0.014) | 0.56013137 (±0.000002) | 0.0657 | constant period |
| AR Her | RRab | 443 | 102 | 41454.3115 (±0.006) | 0.47000728 (±0.0000003) | 0.1157 | irregular period |
| V 422 Her | RRab | 22 | 19 | 34131.4344 (±0.009) | 0.51585172 (±0.000002) | 0.0423 | constant period |
| V 429 Her | RRab | 20 | 16 | 42277.2227 (±0.004) | 0.51834184 (±0.0000009) | 0.0184 | constant period |
| V 794 Her | RRab | 20 | 24 | 42449.4289 (±0.007) | 0.62105033 (±0.000002) | 0.0324 | constant period |
| SZ Hya | RRab | 149 | 108 | 40679.0674 (±0.068) | 0.53726518 (±0.000003) | 0.8272 | irregular period |
| SS Leo | RRab | 61 | 106 | 41781.4047 (±0.003) | 0.62634292 (±0.0000001) | 0.0219 | irregular period |
| AE Leo | RRab | 39 | 93 | 19839.6852 (±0.015) | 0.62671740 (±0.000001) | 0.0915 | irregular period |
| Y LMi | RRab | 24 | 24 | 35556.6530 (±0.003) | 0.52443310 (±0.0000007) | 0.0147 | constant period |
| RR Lyr | RRab | 986 | 108 | 42923.4509 (±0.001) | 0.56683704 (±0.00000009) | 0.0432 | irregular period, cycles numbers (:) |
| AQ Lyr | RRab | 189 | 107 | 35695.0147 (±0.004) | 0.35716181 (±0.0000002) | 0.0527 | irregular period |
| EZ Lyr | RRab | 114 | 108 | 33914.3402 (±0.002) | 0.52526435 (±0.0000001) | 0.0208 | irregular period |
| VV Peg | RRab | 141 | 94 | 39389.5174 (±0.004) | 0.48838352 (±0.0000002) | 0.0470 | irregular period |
| BT Peg | RRab | 28 | 21 | 36457.2553 (±0.004) | 0.55676964 (±0.0000009) | 0.0185 | constant period |
| TU Per | RRab | 36 | 106 | 38772.5576 (±0.007) | 0.60706850 (±0.0000004) | 0.0418 | irregular period |
| V 447 Per | RRab | 27 | 35 | 38641.5533 (±0.002) | 0.53512306 (±0.0000005) | 0.0108 | constant period |
| T Sex | RRc | 43 | 81 | 41384.3551 (±0.015) | 0.32470442 (±0.0000004) | 0.0984 | irregular period |
| SS Tau | RRab | 119 | 105 | 39034.0143 (±0.003) | 0.36991942 (±0.00000009) | 0.0324 | irregular period |
| UY Tri | RRab | 29 | 19 | 38641.6423 (±0.005) | 0.50943033 (±0.0000009) | 0.0276 | constant period |
| W Tuc | RRab | 23 | 16 | 36878.3919 (±0.0005) | 0.64223707 (±0.0000003) | 0.0024 | constant period |
| RV UMa | RRab | 176 | 99 | 45075.5418 (±0.001) | 0.46806283 (±0.00000007) | 0.0190 | irregular period |
| SX UMa | RRc | 113 | 107 | 45109.3351 (±0.013) | 0.30712535 (±0.0000003) | 0.1363 | irregular period |
| EX UMa | RRab | 47 | 15 | 49012.9862 (±0.002) | 0.54283465 (±0.0000004) | 0.0107 | constant period |
| ST Vir | RRab | 65 | 100 | 40736.3349 (±0.014) | 0.41083260 (±0.0000004) | 0.1080 | irregular period |
| BN Vul | RRab | 104 | 108 | 45530.4416 (±0.002) | 0.59412986 (±0.0000001) | 0.0192 | irregular period |