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# MINIMA OF ECLIPSING VARIABLES

We report below the times of minimum light for eclipsing variable stars.

Table 1

| Star | JD hel. 2440000+ | Er | n | f | ap | comp. | Δm min. | Notes | Obs. |
|---|---|---|---|---|---|---|---|---|---|
| SV Cam | 2836.5905 | d.001 | 26 | v | 90 | 001047 | 1.25 | 1)2) | DRS/ADM |
| SV Cam | 2852.601 | .002 | 19 | none | 30 | 001047 | 1.01 | 1) | ADM |
| SV Cam | 2855.5658 | .001 | 27 | v | 30 | 001047 | 1.25 | 1)3) | ADM |
| R CMa | 2820.5936 | .001 | 10 | v | 90 | 152834 | 0.98 | | DRS/ADM |
| YY Gem | 2829.634 | .002 | 28 | v | 90 | 060198 | 8.22: | | DRS/ADM |
| U Peg | 3021.6134 | .001 | 17 | v | 90 | – | – | | DRS |
| β Per | 3066.6630 | .001 | 20 | v | 30 | 056047 | -1.47 | 5) | ADM |
| β Per | 3066.6622 | .001 | 20 | B | 30 | 056047 | -1.49 | 5) | ADM |
| β Per | 3089.6003 | .001 | 20 | V | 30 | 056047 | -1.46 | 5) | ADM |
| β Per | 3089.6008 | .001 | 22 | B | 30 | 056047 | -1.49 | 5) | ADM |
| λ Tau | 3113.6874 | .005 | 24 | V | 30 | 111696 | -0.39 | 5)6) | ADM |
| λ Tau | 3113.6909 | .005 | 24 | B | 30 | 111696 | -0.41 | 5)6) | ADM |
| W UMa | 2829.7280 | .001 | 19 | v | 90 | 027340 | – | | DRS/ADM |
| W UMa | 2863.5915 | .001 | 22 | v | 30 | 027340 | 1.93: | | ADM |
| TX UMa | 2844.694 | .002 | 16 | v | 30 | – | – | | ADM |
| AG Vir | 2892.6620 | .001 | 27 | v | 30 | 099924 | 1.39 | 4) | DRS/ADM |

Table 1, Photoelectric Minima. The observations were made with a UBV photometer, containing a 1P21 phototube, attached to reflecting telescopes of 30 and 90 cm aperture. The time of minimum was calculated by the tracing paper method. Er=the maximum error for the time of minimum; n=number of observations; f=filter; ap=aperture of the telescope in cm; comp=SAO catalog number of the comparison star; Δm min.=m (variable) minus m (comparison) at mid-eclipse in the instrumental magnitude system, except where noted.

Notes: 1) Ascending branch steeper than descending branch.
2) Duration of constant light = 28 minutes. 3) Duration of constant light = 35 minutes. 4) Duration of constant light = 52 minutes. 5) Observations transformed to the standard system. 6) Observations obtained on JD2443113 and 2443117.

Table 2

| JD hel. 2,440,000+ | n | m | Epoch | O-C | Observer |
|---|---|---|---|---|---|
| WZ Andromedae, $\sigma = {}^{d}.006$ | | | | | |
| 3024.654 | 16 | 1 | 11427 | $-{}^{d}.018$ | Krobusek |
| XZ Andromedae, $\sigma = {}^{d}.003$ | | | | | |
| 2665.550 | 6 | 1 | 2586 | -.021 | Mallama |
| 2684.550 | 8 | 1 | 2600 | -.024 | Mallama |
| 2707.626 | 14 | 1 | 2617 | -.022 | Mallama |
| 2722.558 | 11 | 1 | 2628 | -.020 | Mallama |
| AB Andromedae, $\sigma = {}^{d}.006$ | | | | | |
| 2709.588 | 11 | 1 | 19886 | +.021 | Krobusek |
| 3044.623 | 7 | 1 | 20895.5 | +.012 | Krobusek |
| CX Aquarii, $\sigma = {}^{d}.004$ | | | | | |
| 2665.589 | 8 | 1 | 11173 | +.010 | Mallama |
| OO Aquilae, $\sigma = {}^{d}.006$ | | | | | |
| 2601.654 | 7 | 1 | 17120 | -.028 | Krobusek |
| 2602.659 | 8 | 1 | 17122 | -.037 | Krobusek |
| 2603.670 | 8 | 1 | 17124 | -.040 | Krobusek |
| 2709.600 | 7 | 1 | 17333 | -.029 | Krobusek |
| 3008.598 | 9 | 1 | 17923 | -.040 | Krobusek |
| 3010.629 | 8 | 1 | 17927 | -.036 | Krobusek |
| HP Aurigae, σ = ------ | | | | | |
| 2683.78 | 5 | 1 | ----- | ---- | Mallama |
| RX Cassiopeiae, $\sigma = {}^{d}.5$ | | | | | |
| 2706.5 | 6 | 2 | 578.5 | +3.0 | Mallama |
| 2883.7 | 5 | 2 | 584 | +2.4 | Mallama |
| RZ Cassopeiae, $\sigma = {}^{d}.004$ | | | | | |
| 2412.644 | 15 | 1 | 4408 | +.006 | Mallama |
| 2412.650 | 18 | 1 | 4408 | +.011 | Krobusek |
| 2510.655 | 13 | 1 | 4490 | +.006 | Krobusek |
| SX Cassiopeiae, $\sigma = {}^{d}.03$ | | | | | |
| 2739.2: | 5 | 1 | 240 | -0.2: | Mallama |
| U Cephei, $\sigma = {}^{d}.002$ | | | | | |
| 2392.583 | 19 | 1 | 1645 | +.027 | Krobusek |
| 2741.617 | 11 | 2 | 1785 | +.037 | Mallama |

| JD hel. 2,440,000+ | n | m | Epoch | O-C | Observer |
|---|---|---|---|---|---|
| EG Cephei, $\sigma = {}^{d}.003$ | | | | | |
| 2598.739 | 12 | 1 | 28771 | $+{}^{d}.013$ | Krobusek |
| 2664.641 | 15 | 1 | 28892 | +.016 | Mallama |
| EK Cephei, $\sigma = {}^{d}.006$ | | | | | |
| 2447.545 | 14 | 1 | 778 | +.002 | Krobusek |
| TW Ceti, $\sigma = {}^{d}.004$ | | | | | |
| 2392.545 | 9 | 1 | 37039 | -.021 | Krobusek |
| RW Comae Berenices, $\sigma = {}^{d}.004$ | | | | | |
| 2860.716 | 12 | 1 | 41375.5 | -.043 | Krobusek |
| 2861.676 | 9 | 1 | 41379.5 | -.032 | Krobusek |
| 2920.643 | 13 | 1 | 41628 | -.046 | Krobusek |
| 2922.665 | 15 | 1 | 41636.5 | -.041 | Krobusek |
| 2925.638 | 10 | 1 | 41649 | -.035 | Krobusek |
| W Corvi, $\sigma = {}^{d}.01$ | | | | | |
| 2510.637 | 8 | 1 | 37748 | -.005 | Krobusek |
| 2860.683 | 10 | 1 | 38650 | -.008 | Krobusek |
| 2861.662 | 9 | 1 | 38652.5 | +.001 | Krobusek |
| V Crateris, $\sigma = {}^{d}.005$ | | | | | |
| 2489.690 | 19 | 1 | 21408 | +.021 | Krobusek |
| 2861.765 | 8 | 2 | 21938 | +.018 | Krobusek |
| ZZ Cygni, $\sigma = {}^{d}.003$ | | | | | |
| 2599.672 | 10 | 1 | 34142 | -.029 | Krobusek |
| 2699.617 | 8 | 1 | 34301 | -.034 | Mallama |
| 2968.666 | 9 | 1 | 34729 | -.034 | Krobusek |
| 2985.642 | 10 | 1 | 34756 | -.031 | Krobusek |
| 2990.669 | 10 | 1 | 34764 | -.033 | Krobusek |
| TT Delphini, $\sigma = {}^{d}.005$ | | | | | |
| 2665.645 | 11 | 1 | 1535 | +.048 | Mallama |
| TY Delphini, $\sigma = {}^{d}.006$ | | | | | |
| 2985.650 | 11 | 1 | 12564 | +.007 | Krobusek |
| 3010.661 | 15 | 1 | 12585 | +.004 | Krobusek |
| Z Draconis, $\sigma = {}^{d}.002$ | | | | | |
| 2576.674 | 11 | 1 | 6857 | .000 | Krobusek |
| 2595.678 | 12 | 1 | 6870 | .000 | Krobusek |

| JD hel. 2,440,000+ | n | m | Epoch | O-C | Observer |
|---|---|---|---|---|---|
| RZ Draconis, σ = $^d_.005$ | | | | | |
| 2412.553 | 8 | 1 | 23533 | $-^d_.015$ | Krobusek |
| 2412.556 | 9 | 1 | 23533 | -.012 | Mallama |
| 2576.715 | 6 | 1 | 23831 | -.014 | Krobusek |
| 2608.670 | 9 | 1 | 23889 | -.010 | Krobusek |
| 2922.662 | 13 | 1 | 24459 | -.018 | Krobusek |
| 3008.599 | 10 | 1 | 24615 | -.017 | Krobusek |
| TW Draconis, σ = $^d_.003$ | | | | | |
| 2707.600 | 14 | 1 | 3142 | -.038 | Mallama |
| AI Draconis, σ = $^d_.005$ | | | | | |
| 2598.704 | 13 | 1 | 2954 | -.003 | Krobusek |
| 2664.651 | 16 | 1 | 3009 | +.009 | Mallama |
| 3020.692 | 19 | 1 | 3306 | +.002 | Krobusek |
| SZ Herculis, σ = $^d_.003$ | | | | | |
| 2577.686 | 11 | 1 | 9278 | +.027 | Krobusek |
| 2964.644 | 11 | 1 | 9751 | +.026 | Krobusek |
| VX Lacertae, σ = $^d_.005$ | | | | | |
| 2664.634 | 17 | 1 | 7855 | -.060 | Mallama |
| 2707.617 | 14 | 1 | 7895 | -.057 | Mallama |
| CM Lacertae, σ = $^d_.003$ | | | | | |
| 2665.632 | 13 | 1 | 9746 | -.008 | Mallama |
| TZ Lyrae, σ = $^d_.005$ | | | | | |
| 2596.651 | 13 | 1 | 41464 | +.021 | Krobusek |
| 2696.588 | 6 | 1 | 41653 | +.010 | Krobusek |
| 2964.715 | 11 | 1 | 42160 | +.024 | Krobusek |
| 2990.637 | 15 | 1 | 42209 | +.033 | Krobusek |
| 3008.609 | 10 | 1 | 42243 | +.025 | Krobusek |
| 3044.562 | 10 | 1 | 42311 | +.018 | Krobusek |
| U Ophiuchi, σ = $^d_.01$ | | | | | |
| 2990.641 | 12 | 1 | 20694 | +.002 | Krobusek |
| ER Orionis, σ = $^d_.007$ | | | | | |
| 2433.625 | 10 | 1 | 13993.5 | -.021 | Krobusek |
| 2446.540 | 9 | 1 | 14024 | -.019 | Krobusek |
| 2751.593 | 8 | 1 | 14744.5 | -.027 | Krobusek |

| JD hel. 2,440,000+ | n | m | Epoch | O-C | Observer |
|---|---|---|---|---|---|
| U Pegasi, $\sigma = {}^{d}.004$ | | | | | |
| 3020.679 | 13 | 1 | 17367.5 | $-{}^{d}.015$ | Krobusek |
| 3024.612 | 10 | 2 | 17378 | -.017 | Krobusek |
| RT Persei, $\sigma = {}^{d}.003$ | | | | | |
| 2684.634 | 7 | 1 | 21346 | -.060 | Mallama |
| 2842.625 | 7 | 1 | 21532 | -.059 | Krobusek |
| IZ Persei, $\sigma = {}^{d}.01$ | | | | | |
| 2722.682 | 14 | 1 | 4651 | +.011 | Mallama |
| β Persei, $\sigma = {}^{d}.01$ | | | | | |
| 2699.638 | 12 | 1 | 1123 | -.088 | Mallama |
| 2722.590 | 10 | 1 | 1131 | -.075 | Mallama |
| 2765.600 | 10 | 1 | 1146 | -.076 | Mallama |
| 3089.597 | 18 | 1 | 1259 | -.094 | Krobusek |
| RZ Scuti, $\sigma = {}^{d}.07$ | | | | | |
| 2684.61: | 4 | 3 | 372 | +.14: | Mallama |
| BS Scuti, $\sigma = {}^{d}.003$ | | | | | |
| 2689.594 | 12 | 2 | 4692 | -.046 | Mallama |
| RZ Tauri, $\sigma = {}^{d}.01$ | | | | | |
| 2844.643 | 6 | 1 | 12433 | +.003 | Krobusek |
| HU Tauri, $\sigma = {}^{d}.01$ | | | | | |
| 2786.715 | 20 | 1 | 8338 | +.026 | Krobusek |
| X Trianguli, $\sigma = {}^{d}.003$ | | | | | |
| 2745.606 | 11 | 1 | 5325 | -.036 | Mallama |
| 3052.608 | 11 | 1 | 5641 | -.038 | Krobusek |
| XZ Ursae Majoris, $\sigma = {}^{d}.005$ | | | | | |
| 2925.625 | 14 | 1 | 13532 | -.072 | Krobusek |
| W Ursae Minoris, $\sigma = {}^{d}.01$ | | | | | |
| 2412.649 | 12 | 1 | 5264 | -.006 | Krobusek |
| RU Ursae Minoris, $\sigma = {}^{d}.007$ | | | | | |
| 2844.612 | 18 | 1 | 31220 | -.008 | Krobusek |

| JD hel. 2,440,000+ | n | m | Epoch | O-C | Observer |
|---|---|---|---|---|---|
| AZ Virginis, σ = $^{d}.005$ | | | | | |
| 2489.750 | 8 | 1 | 47686 | $-^{d}.038$ | Krobusek |
| 2540.624 | 9 | 1 | 47857 | -.036 | Krobusek |
| Z Vulpeculae, σ = $^{d}.01$ | | | | | |
| 2716.718 | 14 | 2 | 7031 | +.016 | Mallama |

Table 2, Visual Minima. For each minimum, both the descending and ascending branch of the light curve was observed.The time of minimum was measured by the tracing paper method. After the star name, the standard deviation, σ, expected for a single primary minimum was obtained visually for a star of that light curve is given.These standard deviations are calculated from studies by Mallama, (1974a, 1974b). JD hel=heliocentric Julian date of minimum light; n = number of visual estimates contributing to the light curve; m = number of different minima used in the light curve. Epoch and O-C refer to the linear elements in GCVS 1969.

Table 3

| | |
|---|---|
| JD 2414512.59 | JD 2416595.67 |
| JD 2415902.59 | JD 2418524.45 |
| JD 2416242.68 | |

Table 3, Photographic Minima of BF Virginis. One of us (P.A.P.) searched 200 photographic plates in the Harvard collection to identify times when the variable was faint between 1891 and 1937. The results tend to support the suggestion by Mallama and Witt (1976) that a large period change may have occurred before 1930, but more data are needed to verify this.

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