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NEW ELEMENTS FOR 80 ECLIPSING BINARIES VI.

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The ASAS-3 (Pojmanski, 2002), NSVS (Wozniak et al., 2004) and Hipparcos (Perryman et al., 1997) databases have been used to find new elements for a fifth set of 80 eclipsing binaries. NSVS, ASAS-3 and Hipparcos data have been combined to improve the period determinations. Unfiltered NSVS ROTSE1 magnitudes were shifted to match the V magnitude of the stars. When neither ASAS nor Hipparcos observations exist, the original ROTSE1 magnitudes have been given. Saturated data in ASAS-3 and flagged observations in the Hipparcos Epoch Photometry and the NSVS dataset were also discarded. Hipparcos observations have been transformed to V using a table by the author published electronically in IBVS No. 5482 (Otero, 2003). The candidate stars were selected from the Hipparcos Variability Annex and the NSV catalogue (Kukarkin and Kholopov, 1982) and its supplement (NSVS) (Kazarovets et al., 1998). Stars classified as eclipsing binaries and those showing mean Hp magnitudes close to the maximum Hp values in the Hipparcos Variability Annex were identified and their ASAS-3 and/or NSVS data subsequently obtained. Stars in the NSV catalogues that had no given classification or were classified as eclipsing binaries, S, L, I, CST or VAR with no spectral type published or spectral type K or earlier were also checked. Elements were found with AVE (Barberá, 1999).

Table 1 shows the list of variables. The first column gives the variable star designation according to the GCVS. The following columns give another identifier; the brightness range of the variable (* = ROTSE1 magnitudes), with the magnitude of secondary eclipse between brackets; the epoch of minimum light derived from all the data available; the period; the variability class and the spectral type with a note to the spectral type source.

Table 1. New elements for 80 eclipsing binary stars.

| Variable | Star Name Other ID | Magnitude range (V) | Epoch (HJD2440000+) | Period (days) | Type | Spectral type |
|------------|-----------------------|------------------------|------------------------|------------------|-------|----------------|
| NSV 00043* | GSC 4492 0986 | 11.05–11.42(11.40)* | 11482.647 | 3.7659 | EA | A3IV (45) |
| NSV 00856* | GSC 2332 0248 | 10.85–11.65(10.95)* | 11521.683 | 13.620 | EA | |
| NSV 00901 | GSC 3296 0928 | 12.07–12.35 12.20)* | 11452.702 | 1.8771 | EA | A8 (14) |
| NSV 01217* | GSC 2359 0782 | 12.65–13.22(13.20)* | 11536.724 | 0.366556 | EW/KW | |
| NSV 01697* | GSC 0091 0830 | 9.51–10.06 (9.95) | 11946.829 | 18.897 | EA | G5(V) (17) |
| NSV 01978* | HD 294092 | 11.57–12.4:(12.1:) | 13058.657 | 4.48716 | EA | G4 (45) |
| NSV 01986 | HD 035753 | 9.65–10.21 (9.71) | 11579.808 | 2.29609 | EA | A9V (4) |
| NSV 02403 | GSC 0713 0562 | 12.95–13.6(13.45:) | 12884.867 | 6.3650 | EA | |
| NSV 02503* | GSC 1865 2657 | 10.15–10.75:(10.61) | 13347.724 | 5.43077 | EA | A3m (14) |
| NSV 02652* | GSC 6494 0241 | 11.45–12.2:(12.0:) | 12634.783 | 10.6495 | EA | |
| NSV 02895* | GSC 1315 1391 | 11.55–12.06(12.05) | 11504.715 | 2.55156 | EA | |
| NSV 02940* | | 13.47–14.7:(14.3:) | 13399.565 | 1.59290 | EA | |
| NSV 03014 | GSC 0150 1044 | 12.70–13.2:(13.15:) | 11565.855 | 2.44879 | EA | |
| NSV 03210* | GSC 1893 0748 | 12.78–13.6:(13.2:) | 13345.698 | 0.757285 | EA | |
| NSV 03251* | GSC 5391 1022 | 12.07–13.08(12.17) | 11920.655 | 2.3540 | EA | |
| NSV 03300* | HD 267059 | 11.48–12.25 (12.1) | 13045.632 | 1.69841 | EA | A (33) |
| NSV 03346* | GSC 1348 1004 | 12.24–14.5:(12.35) | 13465.450 | 3.30831 | EA | |
| NSV 03450 | GSC 1350 0117 | 12.33–13.6 (12.58) | 11548.725 | 0.605946 | EA | |
| NSV 03521 | GSC 0767 0641 | 11.94–13.9:(12.05) | 13113.570 | 0.99369 | EA | |
| NSV 03637 | GSC 0182 2516 | 11.88–12.65(12.18) | 11560.719 | 5.04735 | EA | |
| NSV 03654 | GSC 5397 2526 | 12.95–14.35: (-) | 12958.760 | 2.65361 | EA | |
| NSV 03822 | HD 065212 | 9.36–9.9: (9.6:) | 12655.733 | 4.53022 | EA | A1/2V (2) |
| NSV 03849 | GSC 5994 3338 | 11.88–12.75:(12.15) | 13053.678 | 1.75072 | EA | |
| NSV 03878 | GSC 2973 0339 | 9.73–10.1:(9.80)* | 11497.820 | 2.2353 | EA | A2 (14) |
| NSV 03951* | GSC 9201 0234 | 11.98–12.81(12.16:) | 13461.716 | 1.92193 | EA | |
| NSV 03975* | SAO 199009 | 9.61–9.91 (-) | 13413.710 | 115.481 | EA | F8 (57) |
| NSV 04095* | GSC 5440 1394 | 11.55–12.23(11.86) | 11578.880 | 7.3089 | EA | A (14) |
| NSV 04205 | GSC 8938 1101 | 11.02–11.47(11.20) | 12619.896 | 8.0758 | EA | |
| NSV 04347 | GSC 0817 2254 | 11.80–12.36(12.32) | 11630.657 | 0.4216475 | EW | |
| NSV 04408 | HD 302103 | 10.96–11.82(11.35) | 12690.713 | 3.13602 | EA | A (9) |
| NSV 04476* | HD 304625 | 10.20–10.75:(10.60:) | 13383.850 | 4.84493 | EA | B8 (14) |
| NSV 05056* | GSC 7212 0360 | 11.52–12.24(12.24) | 13447.705 | 3.59426 | EA | |
| NSV 05584* | GSC 7241 0413 | 10.80–11.60(10.97) | 12710.707 | 0.996386 | EA | |
| NSV 05891* | HD 110544 | 9.56–9.78 (9.60) | 12064.518 | 1.270335 | EA | G8IVCNIII (3) |
| NSV 05987* | GSC 0291 0300 | 13.3–14.1 (13.8) | 13392.858 | 0.352864 | EB/KW | |
| NSV 06047 | GSC 7253 1662 | 11.97–12.7 (12.26) | 13133.814 | 1.069415 | EA | |
| NSV 06078 | HD 312256 | 9.68–10.22(10.13) | 13153.621 | 5.97872 | EA | B0V (56) |
| NSV 06226 | GSC 7791 0774 | 11.70–13.8 (11.83) | 13106.757 | 2.13185 | EA | |
| NSV 06518* | GSC 9013 1470 | 11.30–11.70(11.36) | 12720.688 | 1.44876 | EA | |
| NSV 06584* | GSC 9013 1272 | 10.95–11.65(11.4:) | 12652.828 | 2.32713 | EA | |
| NSV 06595 | GSC 6739 0897 | 13.25–13.8 (13.8) | 13251.520 | 0.342528 | EW | |
| NSV 06624* | GSC 7290 0768 | 11.77–12.76(12.05) | 13063.822 | 2.582712 | EA | |
| NSV 06925 | GSC 9028 0849 | 12.30–14.3(12.33:) | 12417.590 | 19.0017 | EA | |
| NSV 07222 | GSC 5605 0823 | 12.46–13.35(12.55) | 13140.750 | 18.002 | EA | |
| NSV 07274 | HD 141329 | 9.85:–10.25(10.10) | 12145.497 | 1.29838 | EB | A2/3III/IV (2) |
| NSV 07283* | GSC 6190 0563 | 13.5–14.3 (14.3) | 12755.914 | 0.351671 | EW | |
| NSV 07991* | HD 151742 | 8.55–9.0: (8.79) | 12192.575 | 61.874 | EA | ApSi (2) |
| NSV 08020* | HD 152218 | 7.58–7.67 (7.59) | 12468.620 | 5.604 | EA | O9V (2) |
| NSV 08780* | GSC 0409 1742 | 12.50–13.2 (13.2) | 12860.694 | 0.419892 | EW | |
| NSV 09018* | HD 323569 | 11.21–11.60(11.52) | 12117.565 | 5.54177 | EA | A (9) |
| NSV 09234* | GSC 1000 1400 | 11.40–12.0 (-) | 13122.835 | 3.46464 | EA | |
| NSV 09677 | GSC 8355 0356 | 12.25–13.3 (12.37) | 12463.628 | 1.65552 | EA | |
| NSV 09708* | HD 324381 | 10.40–11.00(10.92:) | 12549.519 | 9.1066 | EA | G0 (9) |
| NSV 09853* | GSC 1553 1077 | 12.65–14.1:(13.2:) | 13229.608 | 2.467545 | EA | |
| NSV 09919 | GSC 0421 0745 | 12.83–13.85:(12.97) | 13448.899 | 0.776761 | EA | |
| NSV 10624* | GSC 6277 0816 | 11.95:–12.35:(12.3:) | 12566.494 | 2.37999 | EA | |
| NSV 10845 | GSC 8371 2232 | 11.97–12.50(12.10) | 12114.769 | 0.838637 | EA | |

Table 1. New elements for 80 eclipsing binary stars. (cont.)

| Variable | Star Name Other ID | Magnitude range (V) | Epoch (HJD2440000+) | Period (days) | Type | Spectral type |
|------------|-----------------------|------------------------|------------------------|------------------|--------|---------------|
| NSV 10870 | GSC 1031 1766 | 12.50–13.0 (12.9) | 11484.658 | 0.602937 | EB/KE | |
| NSV 11391 | GSC 7928 1244 | 11.08–12.0 (11.18) | 12943.530 | 0.978382 | EA | |
| NSV 12107 | HD 183764 | 7.60–7.95 (7.76) | 12055.777 | 1.43979 | EA | B8V (3) |
| NSV 12514 | GSC 1620 0078 | 12.20–12.55(12.48) | 11482.654 | 0.41586 | EW/KE: | |
| NSV 13016 | HD 239379 | 9.86–10.65:(10.52)* | 11492.835 | 0.311250 | EW | F8 (24) |
| NSV 13663 | GSC 0540 0826 | 11.44–11.72(11.66) | 11356.700 | 5.4788 | EA | |
| NSV 13853* | GSC 2201 1919 | 11.75–12.25(12.00)* | 11486.805 | 0.78099 | EB | |
| NSV 14193* | GSC 8449 0182 | 11.25–11.65:(11.6:)* | 13298.633 | 7.3334 | EA | |
| NSV 14280* | GSC 4654 1090 | 13.10–13.85 (-)* | 11353.855 | 2.91935 | EA | |
| NSV 14315 | GSC 9484 0472 | 13.3–14.4: (13.4) | 12521.638 | 3.5088 | EA | |
| NSV 15483* | HIP 010765 | 8.63–8.72 (8.65) | 8674.823 | 1.87970 | EA | F5V (3) |
| NSV 16154* | HIP 021955 | 8.78–8.93(8.93:) | 7908.707 | 7.447126 | EA | A2 (24) |
| NSV 17426 | HD 057220 | 8.32–8.37 (8.34) | 12946.797 | 3.5101 | EB | B8/9III (3) |
| NSV 18655* | HD 306035 | 9.94–10.47(10.24) | 12973.770 | 19.811 | EA | B8 (9) |
| NSV 19280* | GSC 8978 0893 | 11.76–12.02(11.85:) | 13043.798 | 1.72912 | EA | |
| NSV 19643* | HIP 064327 | 8.63–8.80 (8.78) | 13183.610 | 10.35420 | EA/DM | B7V (1) |
| NSV 19913* | HIP 066751 | 8.66–8.80(8.73:) | 8966.453 | 6.50404 | EA | B6II/III (1) |
| NSV 20106 | HIP 070566 | 8.29–8.34 (8.30) | 8612.396 | 2.12408 | EA | F3V (36) |
| NSV 20235* | HIP 073780 | 9.28–9.55 (9.53) | 8681.670 | 7.55596 | EA | G0IV/V (2) |
| NSV 26081* | HIP 115675 | 8.72–8.98 (-) | 8635.393 | 21.66595 | EA | F2V (4) |
| OZ Aps * | HIP 085849 | 8.57–8.90: (-) | 8562.645 | 27.03726 | EA | A1V (1) |
| V1373 Ori* | HIP 025681 | 8.69–8.80 (8.78) | 12184.500 | 122.68 | EB/GS | K4/5III (5) |
| WZ Vol * | HIP 042841 | 8.28–8.52(8.31:) | 8715.90 | 226.25 | EA/GS | G3III (1) |

Sources of spectral type: (1) Houk and Cowley, 1975. (2) Houk, 1978. (3) Houk, 1982. (4) Houk and Smith-Moore, 1988. (5) Houk and Swift, 1999. (9) Nesterov et al., 1995. (14) Kholopov et al., 2003. (17) Buscombe, 1998. (24) Ochsenbein, 1980. (33) Cannon and Pickering, 1993. (36) Jaschek et al., 1964. (45) Skiff, 2003. (56) Buscombe and Foster, 1995. (57) Jackson and Stoy, 1954.

Notes on individual stars:

NSV 00043 = Eccentric system.

NSV 00856 = Missed BD star according to the NSV catalogue (BD+33°460). New identification is based on this being the only bright star in the area.

NSV 01217 = I-type in the NSV catalogue (Kholopov et al., 2004).

NSV 01697 = Changing O’Connell effect. LB-type in the NSV catalogue (Kholopov et al., 2004).

NSV 01978 = IN:-type in the NSV catalogue (Kholopov et al., 2004).

NSV 02503 = Eccentric system. L-type in the NSV catalogue (Kholopov et al., 2004).

NSV 02652 = Eccentric system.

NSV 02895 = Period might be half the value given. Primary eclipse might be the secondary.

NSV 02940 = USNO-A2.0 1050-03445213 = 2MASS J06225989+1639030.

NSV 03210 = NSVS amplitude is reduced by light from nearby stars. Visual binary. 14th mag. companion at 11" (Worley and Douglass, 1997)

NSV 03251 = NSVS amplitude is reduced by light from nearby stars.

NSV 03300 = NSVS amplitude is reduced by light from nearby stars.

NSV 03346 = NSVS amplitude is strongly reduced by light from nearby stars.

NSV 03951 = S-type in the NSV catalogue (Kholopov et al., 2004).

NSV 03975 = Period might be twice the value given.

NSV 04095 = Eccentric system.

NSV 04476 = Eccentric system.

- NSV 05056 = Eccentric system. Primary eclipse might be the secondary.
- NSV 05584 = S-type in the NSV catalogue (Kholopov et al., 2004).
- NSV 05891 = Visual binary. $A= 10^m3$; $B= 10^m6$ Vt. Sep. $0''.45$ (Fabricius et al., 2002).
- NSV 05987 = EW-type in the NSV catalogue (Kholopov et al., 2004).
- NSV 06518 = Discovered by Knigge (1973) who named it as BV 1549 and reported “many minima, but more maxima”. It was classified as L-type in the NSV catalogue. The NSV star is the eclipsing binary. The infrared source IRAS 13581-6433 at $14^h01^m54^s88 - 64^\circ48'24''.3$ (2MASS) is wrongly identified as NSV 6518 by Bidelman and MacConnell (1998) who give spectral type M8 and also by Buscombe (1999) who gives spectral type K0:II:. It was correctly identified by Cieslinski et al. (1997) who photoelectrically observed it at maximum at $V= 11^m3$; $U - B= 0.06$; $B - V= 0^m27$. However they give a G8-K2 spectral type (Cieslinski et al., 1998) inconsistent with their own colors that are for an F-type star.
- NSV 06584 = Eccentric system.
- NSV 06624 = S-type in the NSV catalogue (Kholopov et al., 2004).
- NSV 07283 = Primary eclipse might be the secondary.
- NSV 07991 = Eccentric system.
- NSV 08020 = In NGC 6231. Spectroscopic period of 5.603979 days in Stickland et al. (1997).
- NSV 08780 = NSVS amplitude is strongly reduced by light from nearby stars. Primary eclipse might be the secondary.
- NSV 09018 = Eccentric system. I-type in the NSV catalogue (Kholopov et al., 2004).
- NSV 09234 = Period might be twice the value given.
- NSV 09708 = Eccentric system.
- NSV 09853 = Eccentric system.
- NSV 10624 = The NSV catalog (Kholopov et al., 2004) classifies it as E: with spectral type M6. It's a visual pair. The eclipsing binary ($J - K= 0^m45$) is 2MASS J18195776-2207149 at $18^h19^m57^s77 - 22^\circ07'14''.9$ (2000.0). The red star ($J - K= 1^m7$) is 2MASS J18195750-2207090 at $18^h19^m57^s50 - 22^\circ07'09''.1$ (2000.0). ASAS V-magnitude of the eclipsing binary is contaminated by nearby stars in this rich field. The red star is bright in the IR but too faint in V.
- NSV 13853 = IS:-type in the NSV catalogue (Kholopov et al., 2004).
- NSV 14193 = Eccentric system. Primary eclipse might be the secondary.
- NSV 14280 = Period might be twice the value given.
- NSV 15483 = Visual binary. $A= 9^m1$; $B= 10^m2$ Hp. Sep. $1''.67$ (Perryman et al., 1997) Component C (10.4 Vt) at $37''.4$ (Fabricius et al., 2002) contaminates ASAS data. ASAS V-magnitudes have been adjusted to V derived from Hipparcos.
- NSV 16154 = Period might be half the value given. Primary eclipse might be the secondary. Visual binary. $A= 9^m4$; $B= 9^m9$ Hp. Sep. $0''.77$ (Perryman et al., 1997).
- NSV 18655 = Eccentric system.
- NSV 19280 = Discovered as a possible eclipsing binary by Caldwell et al. (1991). Caldwell's Ic observations have been shifted to the ASAS-V magnitude in the plot.
- NSV 19643 = Slight apsidal motion. Secondary eclipse period is 10.35409 d.
- NSV 19913 = Eccentric system.
- NSV 20235 = Slightly eccentric system.
- NSV 26081 = Period might be twice the value given.
- OZ Aps = Period might be twice the value given.
- V1373 Ori = Classified as a variable with a period of 61.60 days in the Hipparcos Catalogue. SRd variable in the GCVS.

WZ Vol = Total eclipse. Eclipse lasts less than 1 per cent of the cycle. Secondary eclipse at phase 0.29 (very eccentric system) is not confirmed. Period might be twice the value given with similar minima.

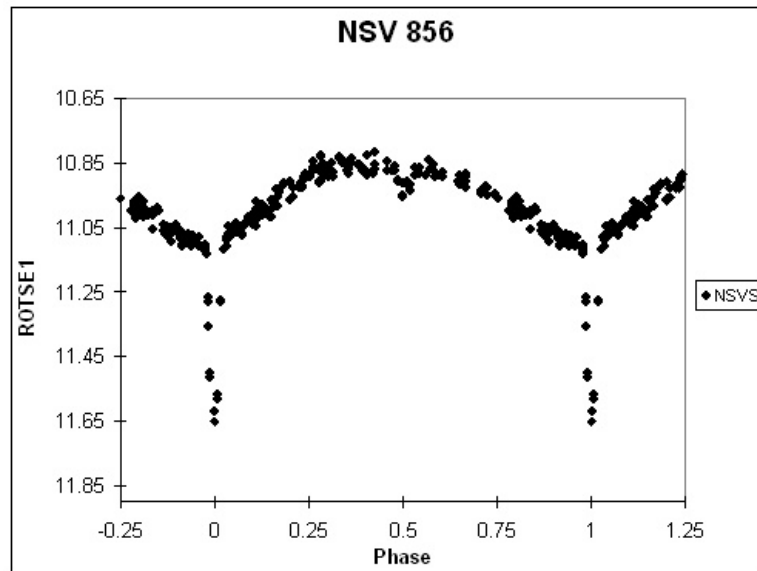


Figure 1. Light curve of NSV 00856 showing NSVS observations.

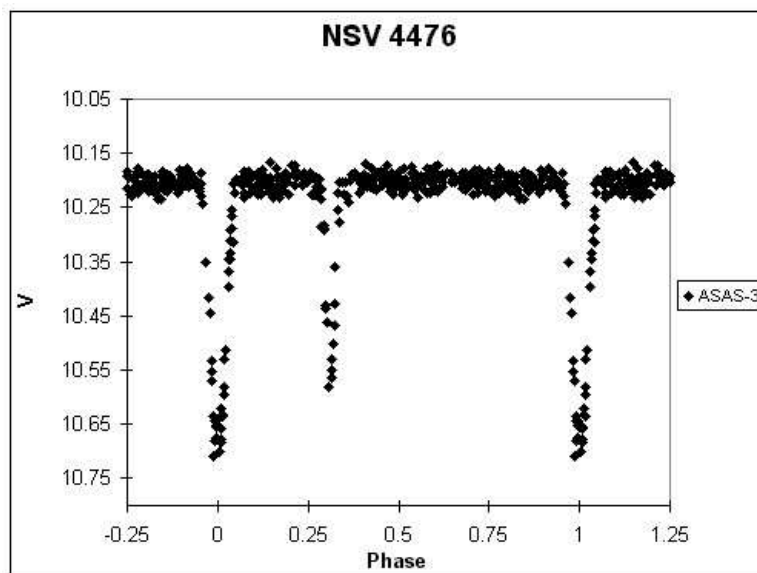


Figure 2. Light curve of NSV 04476 showing ASAS-3 observations.

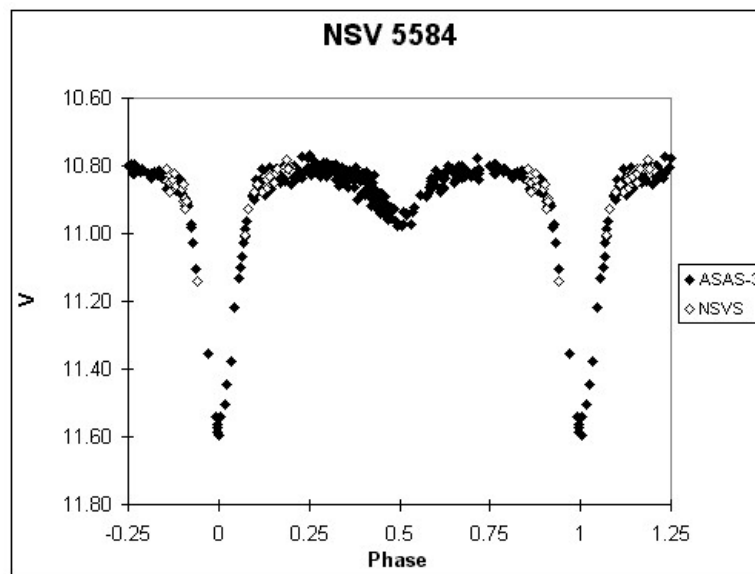


Figure 3. Light curve of NSV 05584 showing ASAS-3 and NSVS observations.

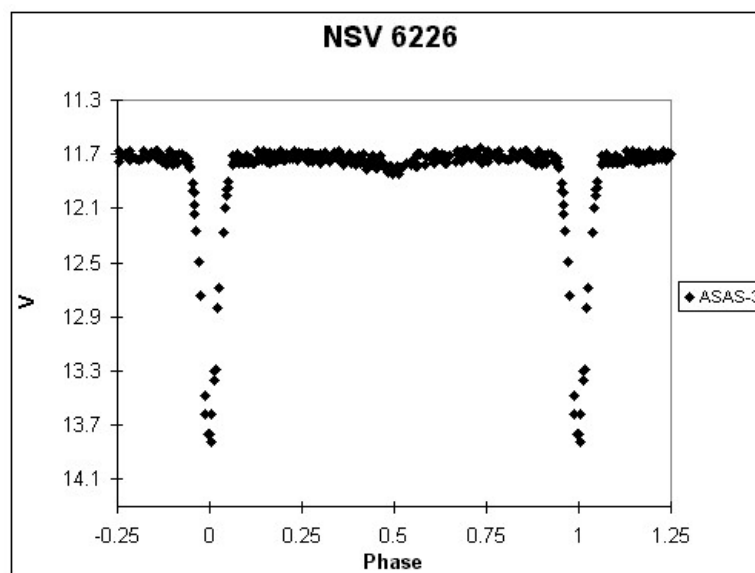


Figure 4. Light curve of NSV 06226 showing ASAS-3 observations.

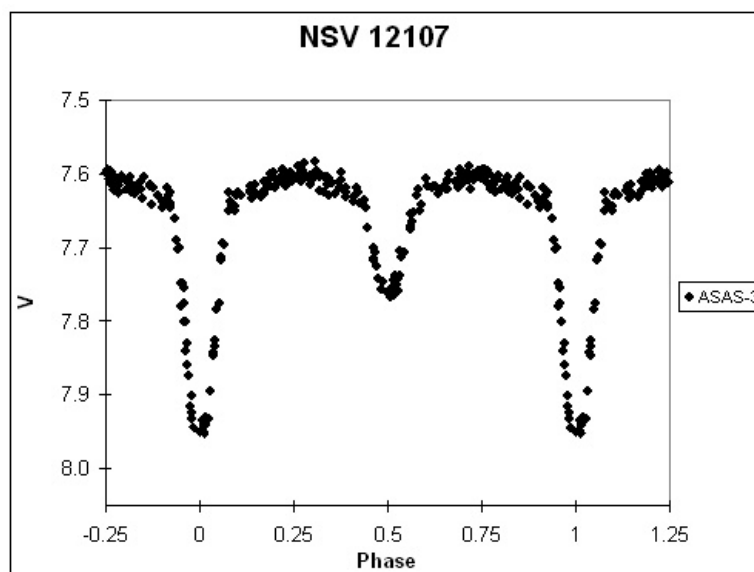


Figure 5. Light curve of NSV 12107 showing ASAS-3 observations.

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ERRATUM FOR IBVS 5586

The following information had been omitted from IBVS 5586:

- Sources of spectral type (Table 1.): (1) Houk and Cowley, 1975. (2) Houk, 1978. (3) Houk, 1982. (5) Houk and Swift, 1999. (8) Kennedy, 1983. (9) Nesterov et al., 1995. (14) Kholopov et al., 2003. (17) Buscombe, 1998. (18) Buscombe, 1999. (24) Ochsenbein, 1980. (27) Grenier et al., 1999. (33) Cannon and Pickering, 1993. (36) Jaschek et al., 1964. (47) Jaschek, 1978. (48) Duflot et al., 1995. (50) Li and Hu, 1998.