MIGRATING WAVES IN SOLAR-TYPE SHORT-PERIOD ECLIPSING BINARIES

L. Milano, G. Russo, S. Mancuso
Capodimonte Astronomical Observatory - Napoli, Italy

One of the properties of RS CVn-like binaries is the presence of cyclic fluctuations, sometimes called "migrating waves", in the V and other broad-band lightcurves. These fluctuations, perhaps due to spots, vary in amplitudes and periods, in the sense that, the longer the orbital period of the RS CVn system, the higher the amplitude of the "wave", which may be up to 30-35% of the total light variation. Therefore, in short-period (less than one day) RS CVn binaries, these fluctuations are generally difficult to be detected. We propose to use the Wilson (1979) method for lightcurve synthesis to separate the fluctuations from the light variation caused by geometric and photometric effects in the binary system, thus allowing a precise measurement of the amplitude and periodicity of the fluctuations which can be correlated to rotation and magnetic fields. The procedure, already applied to RT And (Milano, Russo, Mancuso, 1981) is here extended to UV Psc, WY Cnc, SV Cam and is being applied to CG Cyg, ER Vul, BH Vir. As an example, we give in Fig. 1 the results of the 1965 V light curve of WY Cnc (upper) and the "migrating wave" isolated by means of this technique (bottom), and in Figs 2 and 3 the results for RT And. The "migrating wave", isolated in this way, can then be used for further numerical computations,

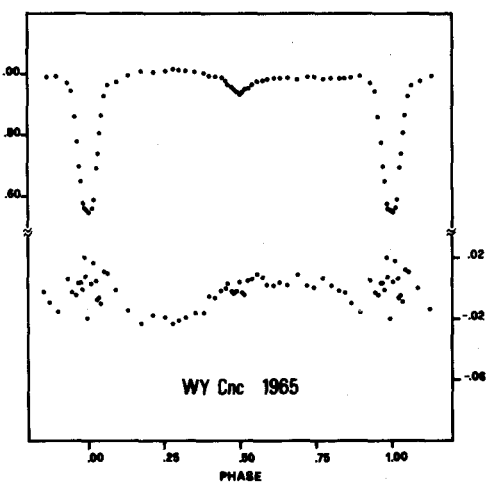

Figure 1. Lightcurve (upper) and "photometric wave" for WY Cnc.

P. B. Byrne and M. Rodonò (eds.), Activity in Red-Dwarf Stars, 393–394.

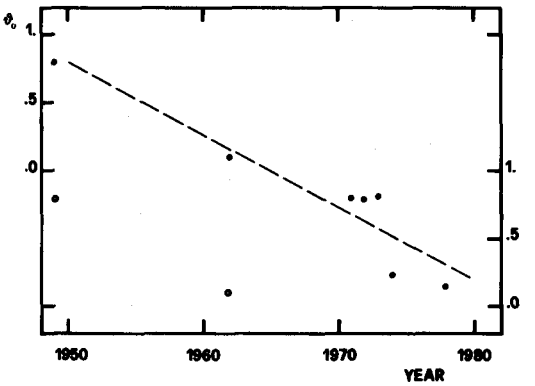

Fig. 2. Phase of "wave" maximum along the time.

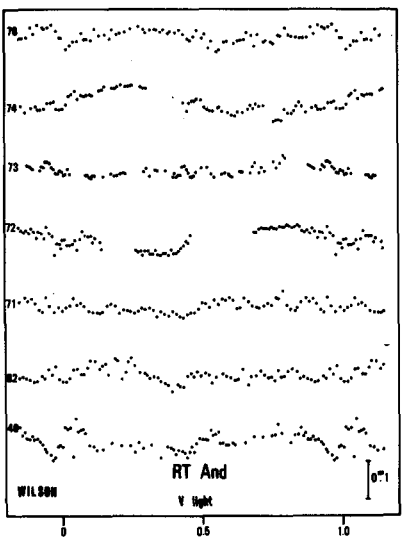

Fig. 3. The "photometric waves" for RT And.

for example for detailed modeling based on the canonical starspot model of Hall (1972), as already applied to the non-eclipsing RS CVn system DM UMa by Kimble, Kohn and Bowyer (1981), to get information on the area covered by starspots and their temperature difference with respect to the photospheres. These starspots should be due to strong coronal and chromospheric activity, enhanced by forced rapid rotations (Linsky, 1980), which can be inferred from modulation in the Ca II H and K lines (Middlekoop et al., 1981). Therefore, as an observational basis of our programme, we are performing a continuous photometric monitoring in the UBV system, and sporadic spectroscopic observations (medium to high resolution) for all the seven short-period systems already mentioned.
The complete discussion of the data we obtained will be published elsewhere.

REFERENCES

Hall, D.S.: 1972, Pubbl. Astron. Soc. Pac. 84, 323.
Kimble, R.A.; Kahn, S.M., and Bowyer, S.: 1981, Ap. J. 251, 585.
Linsky, J.L.: 1980, Ann. Rev. Astr. Ap. 18, 439.
Middlekoop, F., Vaughan, A.H., and Preston, G.W.: 1981, Astron. Astrophys. 96, 401.
Milano, L., Russo, G., and Mancuso, S.: 1981, Astr. Astrophys. 103, 57.

https://doi.org/10.1017/S0252921100096342 Published online by Cambridge University Press