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Simon, Norman R., "RR Lyrae Light Curves: Another Look" (1987). *Norman R. Simon Papers*. 58.  
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RR Lyrae Light Curves: Another Look

N.R. Simon (U. Nebraska-Lincoln)

We examine the light curves of 61 RR<sub>ab</sub> stars from the data of Lub (1977). Fourier decomposition coefficients for 55 of these stars were reported by Simon and Teays (1982); the remaining light curves were Fourier decomposed in the present work. A plot of the Fourier quantities  $\phi_{21}$  and  $\phi_{31}$  vs. the metallicity parameter  $\Delta S$  reveals a dichotomy among these stars. For the shorter-period group (37 stars),  $0.374 \leq P < 0.575$ , the Fourier phases  $\phi_{21}$  and  $\phi_{31}$  are directly correlated with metallicity. This is especially striking in the case of  $\phi_{21}$  which falls off very sharply with  $\Delta S$ . The metallicity in the first group spans the range  $0 \leq \Delta S \leq 8$ . In the longer-period group, on the other hand, the correlation between the Fourier phases and  $\Delta S$  virtually disappears. The latter group (20 stars) is characterized by:  $0.575 < P \leq 0.747$ ,  $6 \leq \Delta S \leq 11$ . The remaining 4 stars stand out in one way or another as follows: AA Aql and S Ara belong to the first group but have  $\phi_{21}$  and  $\phi_{31}$  too small for their respective metallicities; UU Cet and FY Hya have periods which place them well within the second group, but nonetheless seem to follow the phase-metallicity correlation.