MEMBERSHIP AND BINARITY OF RED GIANTS IN OPEN CLUSTERS DETERMINED BY PHOTOELECTRIC RADIAL VELOCITIES

J.-C. Mermilliod* and M. Mayor+

*Institut d'Astronomie de l'Université de Lausanne
+Observatoire de Genève

An observing programme was started in the summer of 1977 to measure radial velocities of red giants in open clusters with the spectrovelocimeter "Coravel" (Baranne *et al.* 1979) attached to the 1 m telescope of the Geneva Observatory installed at the O.H.P. (France). 750 measurements for 160 stars in 30 open clusters north of -20°, with ages ranging from those of NGC 752 to Pleidades, have been obtained. The limiting magnitude is $B = 12.5$.

By comparison, mean radial velocities for some 45 stars included in our programme in 10 clusters, have been found by surveying the literature, including 15 red giants in NGC 752, observed with the Fehrenbach objective prism (Rebeirot 1970).

The average dispersion of the mean V_R of each star, taking instrumental errors into account, is 0.55 km s^{-1} (145 stars). It depends on the magnitude, reaching 1.0 km s^{-1} at $B = 12.5$.

Assessment of membership and detection of binaries are presently the main results obtained. The analysis of the measurements for 130 stars in 20 open clusters revealed 13 non-members. This small number is explained by the selection according to proper motions or position in the HR diagram that has been applied. Application of the E/I test (ratio of the external to the internal dispersion) yielded 21 variables, at the level $E/I > 2$. 19 other red giants are suspected to be binaries, since their mean velocity differs by more than 3σ of the cluster mean radial velocity. The total percentage of binaries detected after two seasons is 40/117 = 34%.

Mean radial velocities for 20 open clusters have been calculated for the first time. The accuracy is better than 0.2 km s^{-1}.

James E. Hesser (ed.), Star Clusters, 361–362.

REFERENCES

Baranne, A., Mayor, M., and Poncet, J.-L.: 1979 *Vistas in Astron.* (to be published).
Rebeirot, E.: 1970, *Astron. Astrophys.* 4, 404.

DISCUSSION

FEAST: Is that velocity dispersion of 0.55, is that after you've left out the variable velocity stars?
MERMILLIOD: Yes.
KRAFT: I don't know whether old plates at coude dispersion are useful in this sort of search, but I should mention that in the Mt. Wilson plate file all five of the giants of NGC 6633 have coude plates of the 200 inch and should be good to a 0.25 km s^{-1}.
CANNON: What colour range can you cover with CORAVEL? How far up the red giant branch can you get?
MERMILLIOD: All along the red giant branch, up to M stars.
CANNON: Have you looked then at M67 - are the bright stars bright enough or are they too faint?
MERMILLIOD: We can't observe the top of the giant branch with the 1-m, but Griffen has observed many stars in it.

https://doi.org/10.1017/S0074180900092172 Published online by Cambridge University Press