VRI photometry of the young open cluster IC2602

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1. Observations

IC2602 at d =~150–155 pc, has an age between 12–36 Myr (Whiteoak 1961, Mermilliod 1981). We have made V(RI)KC photometry in February 1991 at the 1m telescope at Las Campanas. We observed one cluster field, 15 arcmin × 15 arcmin, and an offset field ~60 arcmin W and 30 arcmin N of the nominal cluster centre. We used this field to estimate the degree of contamination of the cluster members by background objects.

2. Results

The resulting photometry for the cluster field is summarized as a (V, V-I) colour-magnitude diagram in Fig. 1(top). Superimposed on it are 10 and 40 Myr isochrones from D’Antona & Mazzitelli (1994). The dotted tracks include the effects of binarity, uncertainty in the distance and magnitude dependent photometric uncertainties. 48 stars lying within the dotted tracks in this and an (R, R-I) colour-magnitude diagram are indicated as final possible members. A similar (V, V-I) diagram for the offset field can also be seen in Fig. 1(middle) with the same tracks superimposed. The space density of stars in the offset field was estimated to be ~2.4 times that of the cluster field based on the total number of stars with V<18 in each field. Scaling down the number of selected stars by this factor, it is clear that there is a significant excess number in the cluster field compared with the offset field. The excess of cluster members appears to be present for V<17 and then sharply declines. We note that Randich et al’s (1995) X-ray augmented members are all brighter than V~17.1. It is not clear from the latter reference, however, whether this is due to X-ray limits or a fall-off in the luminosity function, as is suggested here.

References

Figure 1. A (V,V-I) diagram (top) for the cluster field. The solid line is a 10Myr isochrone, and the dashed line is 40Myr. The dotted lines are the upper and lower limits for possible members. Solid dots are stars which are selected on their position in both this diagram and one for (R,R-I). The middle diagram is a similar diagram for the offset field. The bottom shows the distribution of selected stars with V for both the cluster (solid line) and offset fields (dotted line). The offset data has been reduced by a factor of 2.4 to allow for the increased number density of stars in that field.