

HOMOGENIZED EFFECTIVE TEMPERATURES FOR THE OPEN CLUSTER NGC 188

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(NGC188)

We have analysed the most numerous published independent stellar catalogues of $B - V$ and V values for the open cluster NGC 188. Our analysis started with the reduction of unreddened $(B - V)_0$ indices and V_0 magnitudes from four catalogues to the system of the catalogue of Platais et al. (2003) considered as a basic catalogue. As a next step in our analysis, the reduced $(B - V)_0$ and V_0 magnitudes for the catalogues were used to calculate the variances of data differences for every pair of the catalogues for the stars in common. Then we estimated the errors of these catalogues from data intercomparisons with the technique outlined in Malyuto and Shvelidze (2011).

Then we homogenized the data by their averaging (with the weights inversely proportional to the errors squared). A recent calibration by Casagrande et al. (2010) with the $B - V$ versus effective temperatures for F-G-K dwarfs and subgiants was used to produce the homogenized effective temperatures for 227 stars. The errors of T_{eff} are between 7 and 20 K, they do not account for the uncertainty in the zero point of the temperature scale, which is of order 15 – 20 K (Casagrande et al., 2010).

The published distance modulus $V_0 - M_V = 11.24$ for NGC 188 was taken from Meibom et al. (2009) to derive the absolute magnitudes M_V from the homogenized magnitudes V_0 . The homogenized HR diagram (the relationship between the effective temperatures and the absolute magnitudes) is presented in Fig. 1. The homogenized data may be considered as a source of reliable and homogeneous T_{eff} and M_V values for selected stars for using them as classification templates in future large galactic surveys. The obtained results may be compared with the model results based on the Padova database of stellar evolutionary tracks and isochrones.

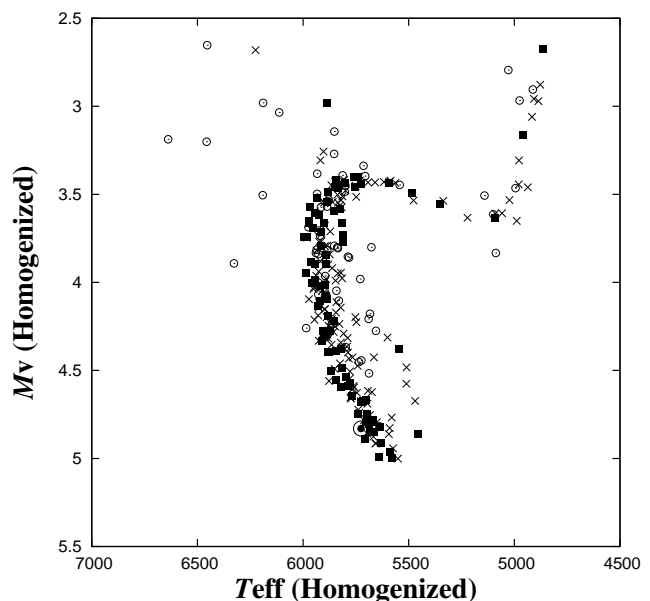


Figure 1: Homogenized HR diagram for NGC 188. Filled squares denote the most precise data with the errors of T_{eff} better 10 K, crosses denote the remaining (less precise) data, open circles denote the stars identified as binaries in the WEBDA site. The position of the Sun is denoted with the filled circle inside the larger open circle. The HRD displays a well-defined main sequence, cluster turnoff and subgiant branch, a population of blue stragglers is also clear.

References

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