INSTRUMENTAL MAGNITUDE AND COLOR INDEX OF FIELD STARS IN THE REGION OF M6 (NGC 6405) AND M7 (NGC 6475) OPEN CLUSTERS

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Abstract. CCD photometry has been obtained in the region of M6 and M7 open clusters by using a portable telescope. Instrumental magnitudes and color index of field stars around M6 and M7 open clusters will be compared with the catalogue standard magnitude and color index to see the trend of data. We have found that instrumental magnitude of field stars in both open clusters has linear relationship to the catalogue standard magnitude as well as the same pattern for data spreading of instrumental color index and catalogue value. Based on this result, we can believe that our photometric system can reproduce catalogue values.

Keywords: Instrumental Magnitudes, Instrumental Colour Index, Open Cluster.

1. Introduction

M6 and M7 is a gorgeous pair of star clusters. There are many different information about distance and size of these clusters. It is probably caused by influence of field stars in both clusters (Vleeming,G. 1974). In our observation on field stars of M6 and M7, those are stars which have distance range about 50' from the centre of M6 and 80' from the center of M7.

By using CCD-based photometry, we have observed brightness of field stars and have obtanined the value of instrumental magnitude of some selected stars.

2. Observation and Data Reduction

Observations have been carried out by using a Celestron C8-SGT f/10 2,03 m telescope with Vixen Sphinx mounting and SBIG ST-8XME CCD camera at Bosscha Observatory on June 7th in year 2010. The CCD camera was equipped with B,V,R,I filters and as long as 10 seconds exposure time pictures have been obtained. The digital images have size of 23,3' x 15,56' field of view. We have analized the images by using aperture photometry with IRAF *(Image Reduction and Analysis Facility).*

3. Results and Discussion

To know trend of data, we have compared instrumental magnitudes and standard magnitudes taken from the Tycho2 catalogue of selected field stars. Data spreading of instrumental and standard magnitudes of field stars in the region of M6 and M7

shows a linear curve. The linearity between instrumental and standard magnitude can be used as an indicator that our photometric system can reproduce the value in the catalogue. Besides instrumental magnitudes, we also obtained the instrumental color index of field stars in those open cluster. Instrumental color index has been compared with standard color index of the catalogue. In the plot (figure 3 and figure 4) we can see data that deviate quite far from the linear fitting. These data comes from low magnitude stars which means faint stars.

We also have plotted color-magnitude diagram of the open clusters based on their instrumental values. As a comparison to instrumental color-magnitude diagram, we also have plotted color-magnitude diagram based on values from the catalogue. We obtained similar pattern between the two (figure 5 and figure 6).

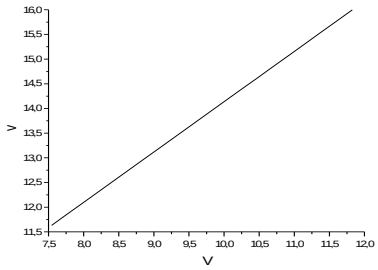

Figure 1. Linearity curve between instrumental and standard magnitude of field stars in the region of M6.

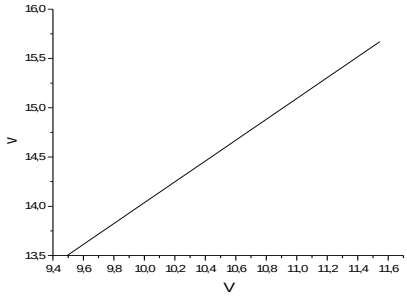

Figure 2. Linearity curve between instrumental and standard magnitude of field stars in the region of M7.

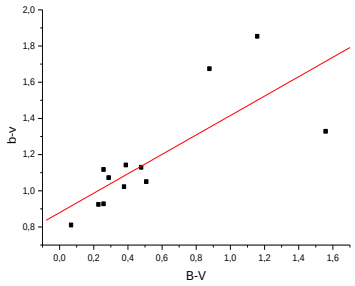

Figure 3. Color index plot between instrumental and standard values of field stars in the region of M6.

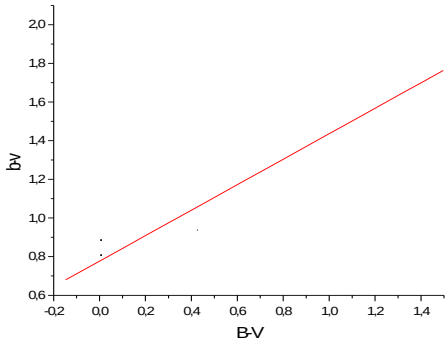

Figure 4. Color index plot between instrumental and standard values of field stars in the region of M7.

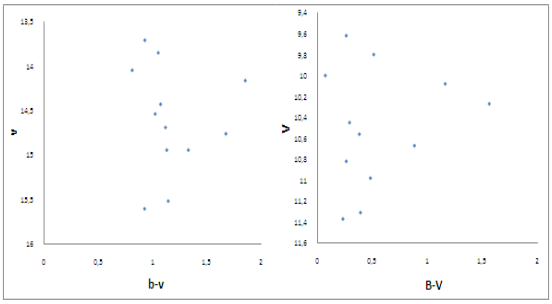

Figure 5. Instrumental color-magnitude diagram *(left)* and standard color-magnitude diagram *(right)* of field stars in the region of M6.

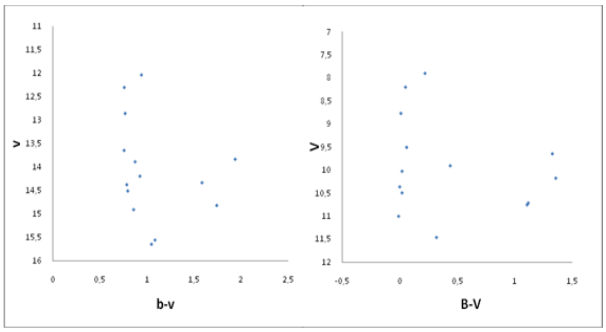

Figure 6. Instrumental color-magnitude diagram *(left)* and standard color-magnitude diagram *(right)* of field stars in the region of M7.

4. Summary

Depend on condition of local night sky and the accuracy of telescope's tracking and pointing, CCD-based photometric system using portable telescope is capable to obtain good data to reproduce the values of the catalogue.

References

Vleeming, G., *A Photometric Study of The Open Cluster M6 (NGC 6405)*, Astron.Astrophys.Supply, **16**, 331-342, 1974.