

## Generation of Hertzsprung-Russel (H-R) diagram using Pleiades Cluster stars to assess the suitability of ACCIMT telescope for photometric studies

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Stars in clusters, as they are in same age and located more or less at the same distance away from the earth, are used for comparative purposes in astronomy than stars located at random. This paper describes an attempt made to construct the Hertzsprung-Russel(H-R) diagram using the biggest telescope in Sri Lanka in view of assessing the suitability of the telescope and its location ( Moratuwa ) on photometric studies in astronomy.

Twenty four standard stars in the open star cluster Pleiades were used for the present study. Caseegrain type 45 cm GOTO telescope located at the ACCIMT, Katubedda, Moratuwa coupled with IP21 photometer and Hamamastu C1230 photon counter was used to measure the visual apparent magnitude of Pleiades stars during clear sky days in November 2003-April 2004 period. Each star was observed with V, B and U filters. The universal time, hour angle, declination and right ascension were recorded along with the photon count. Background illumination was also recorded for each star by moving the telescope to the neighborhood of each star. Then using the extinction equations and statistical methods, extinction coefficients were calculated.

The dead time coefficient of the pulse counting system was found to be  $(2.0129 \pm 0.0001) \times 10^{-7}$  s. First order extinction coefficients  $k'_v, k'_{bv}, k'_{ub}$  are found to be  $0.630 \pm 0.005$ ,  $0.236 \pm 0.006$  and  $0.365 \pm 0.007$ , respectively.. Second order extinction coefficient is  $k''_{bv} = 0.06 \pm 0.08$ . The transformation coefficients  $\epsilon, \mu, \psi$  are found to be  $-0.091 \pm 0.006$ ,  $1.18 \pm 0.04$  and  $0.98 \pm 0.03$ , respectively. The calculated zero point values  $\zeta_v, \zeta_{bv}, \zeta_{ub}$  are  $19.406 \pm 0.005$ ,  $0.62 \pm 0.03$  and  $-1.70 \pm 0.03$ , respectively. The first order extinction coefficient for visible band ( $k'_v$ ) obtained here is important in many astronomy observations to indicate the sky conditions available in Moratuwa observatory area.

The correlation coefficient between standard values of visual apparent magnitude given for Pleiades stars and that of calculated values is 0.99 and the mean value of the difference between the standard and calculated values for the 24 stars considered was only 0.08 magnitudes. Results indicate that the ACCIMT telescope and the associated photon counter set-up can be used in future research on stellar photometry in par with international standards. The limit magnitude of the ACCIMT telescope set-up for photometric studies is found be +12.

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