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Fundamental and Structural Parameters of the Open Star Clusters Be97 and Di06

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Abstract. We present the results obtained from the photometric analysis of the two poorly studied open clusters Berkeley97 (B97) and Dias06 (Di06)

Key words. open clusters and associations: individual: Be97, Di06 – Techniques: photometric

1. Introduction

We have performed CCD $UBV(RI)_C$ photometric observations of two poorly studied open clusters (Berkeley97 and Dias06, hereafter Be97 and Di06), located in the first and second Galactic Quadrant and containing F-G spectral type stars. The photometric data have been acquired at the San Pedro Martir National Observatory, connected to the Universidad Nacional Autónoma de Mexico. Standard data reduction procedures have been applied by using IRAF. By using also $2MASS$ JHK_s photometry we have determined the cluster fundamental and structural parameters, such as the limiting radius [R_{lim}], reddening $E(B-V)$, photometric abundances of metals and heavy elements (Z and [Fe/H]), distance modulus $(V-M_v)_0$, and ages (A). We have used the PPMXL catalogue to determine the cluster membership from the star proper motions (PMs). To select cluster members in all pass-bands ($UBV(RI)_C$JHK_s), we removed the stars with PM uncertainties larger than 4.0 mas/yr. We have used JHK_s photometry from the PPMXL catalogue to determine the stellar Radial Density Profile (RDP) and the cluster limiting radii. Metal and heavy element abundances were determined from the δ(U-B) technique. Distance moduli, distances and ages were obtained comparing the data in different colour-colour (CC) and colour-magnitude (CM) diagrams with the models of Bressan et al. (2012).

2. Conclusions

Figs. 1 and 2 show the PM distributions and the RDPs of the two clusters. A few examples of CC and CM diagrams are plotted in Figs. 3 and 4. The fundamental parameters of the two clusters have been derived from the $UBVRI$ photometry and the $2MASS$ data separately. The results obtained from the two data sets are quite consistent, thus increasing the reliability of our analysis. The values determined are listed in Table 1. The details of the analysis can be found in Akkaya Oralhan et al. (2010) and Akkaya Oralhan et al. (2015).

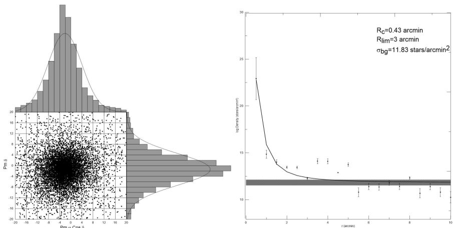

Fig. 1. PM distribution and RDP of Be97

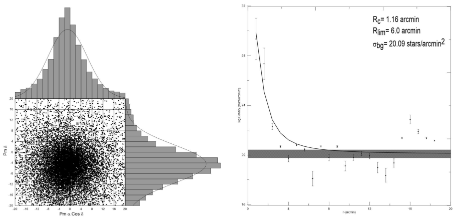

Fig. 2. PM distribtion and RDP of Di06

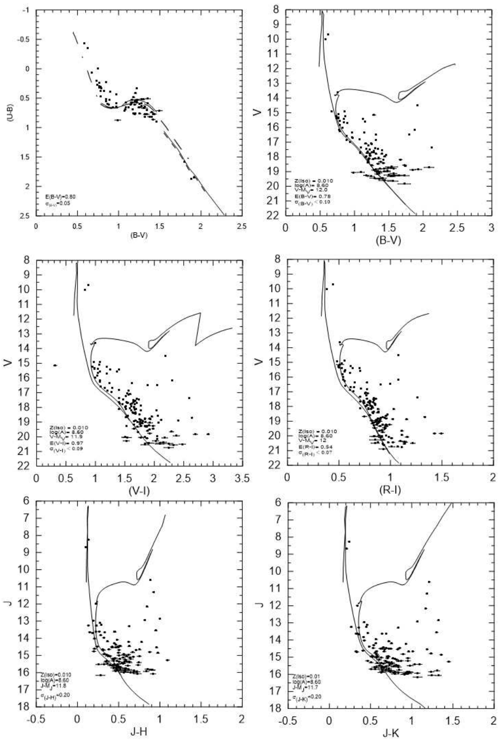

Fig. 3. CC and CM diagrams of Be97

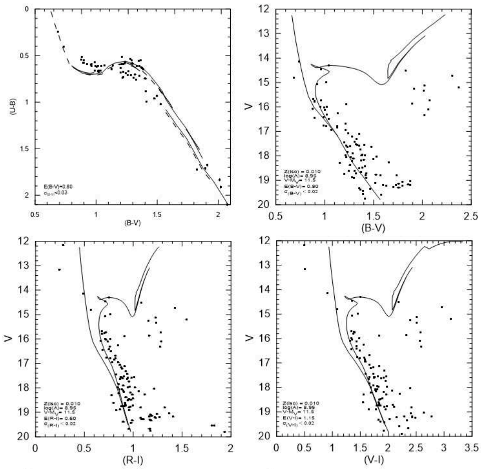

Fig. 4. CC and two of the studied CM diagrams of Di06

Table 1. Fundamental Parameters of the two open clusters Be97 and Di06

Berkeley 97			
R_{lim} [arcmin]	$E(B-V)$	[Fe/H]	Z
3.0	0.78 ± 0.10	-0.18 ± 0.11	0.01 ± 0.002
$(V-M_V)_0$	d [kpc]	$\log(A)_{fit}$	$A_{fit}[Gyr]$
11.93 ± 0.04	2.42 ± 0.05	8.60 ± 0.06	0.39 ± 0.06
Dias 06			
R_{lim} [arcmin]	$E(B-V)$	[Fe/H]	Z
6.0	0.80 ± 0.08	-0.16 ± 0.11	0.01 ± 0.002
$(V-M_V)_0$	d [kpc]	$\log(A)_{fit}$	A_{fit}[Gyr]
11.50 ± 0.03	1.99 ± 0.03	8.96 ± 0.02	0.91 ± 0.05

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