

Essai de calibration photométrique instrumentale

Instrumental photometric calibration test

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Octobre 2016

1)

Méthode

Choix d'un amas

Sélection d'étoiles

Etoile de référence

Choix des cercles pour la photométrie

Mesure des flux lumineux en B

Mesure des flux lumineux en V

A partir des magnitudes B et V de l'étoile de référence, calcul des magnitudes B et V des étoiles sélectionnées

Calcul des écarts entre les données catalogue des magnitudes B et V des étoiles sélectionnées et des mesures précédentes

Moyenne des écarts en B et en V

Application aux magnitudes mesurées pour obtenir les magnitudes corrigées en B et en V

Method

Choosing a cluster

Selection of stars

Comparison stars

Choice of circles for photometry

Measuring luminous flux B

Measuring luminous flux V

From the magnitudes B and V of the comparison star, calculating the magnitudes B and V of the selected stars

Calculation of the discrepancies between the data catalog magnitudes B and V of selected stars and previous measures

Average differences in B and V

Application to measured magnitudes in order to obtain magnitudes corrected in B and V

2)

Exemple

NGC 957 d~1815 parsecs

http://www.univie.ac.at/webda/cgi-bin/ocl_page.cgi?cluster=NGC+957

[http://articles.adsabs.harvard.edu/cgi-bin/nph-](http://articles.adsabs.harvard.edu/cgi-bin/nph-article_query?1980A%26AS...41...9G&data_type=PDF_HIGH&whole_paper=YES&type=PRINTER&filetype=.pdf)

[article_query?1980A%26AS...41...9G&data_type=PDF_HIGH&whole_paper=YES&type=PRINTER&filetype=.pdf](http://articles.adsabs.harvard.edu/cgi-bin/nph-article_query?1980A%26AS...41...9G&data_type=PDF_HIGH&whole_paper=YES&type=PRINTER&filetype=.pdf)

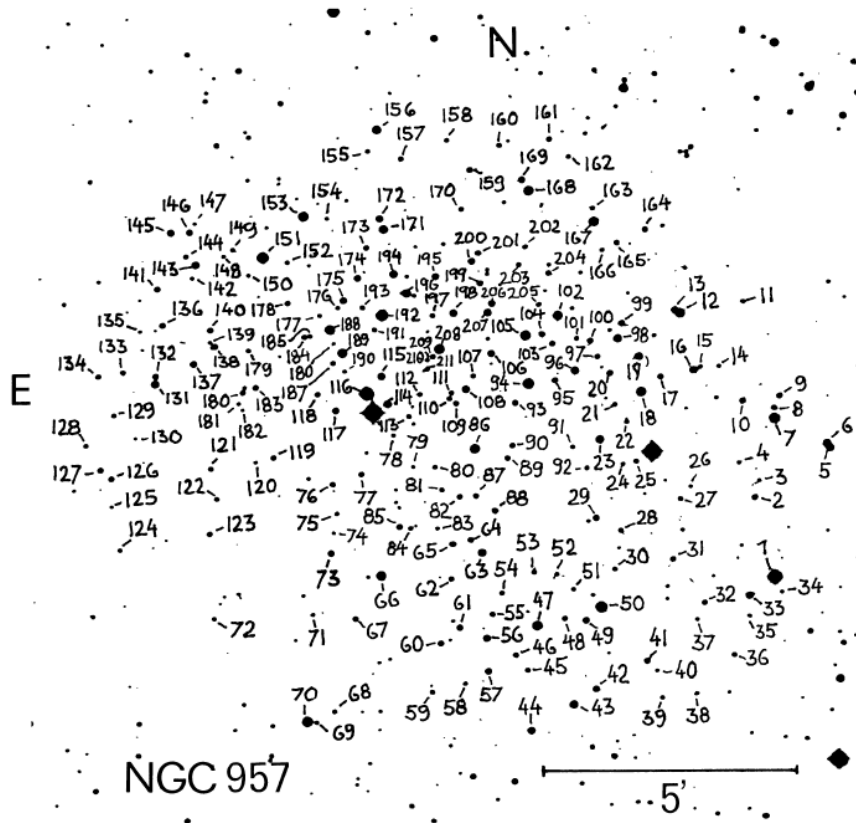
Example

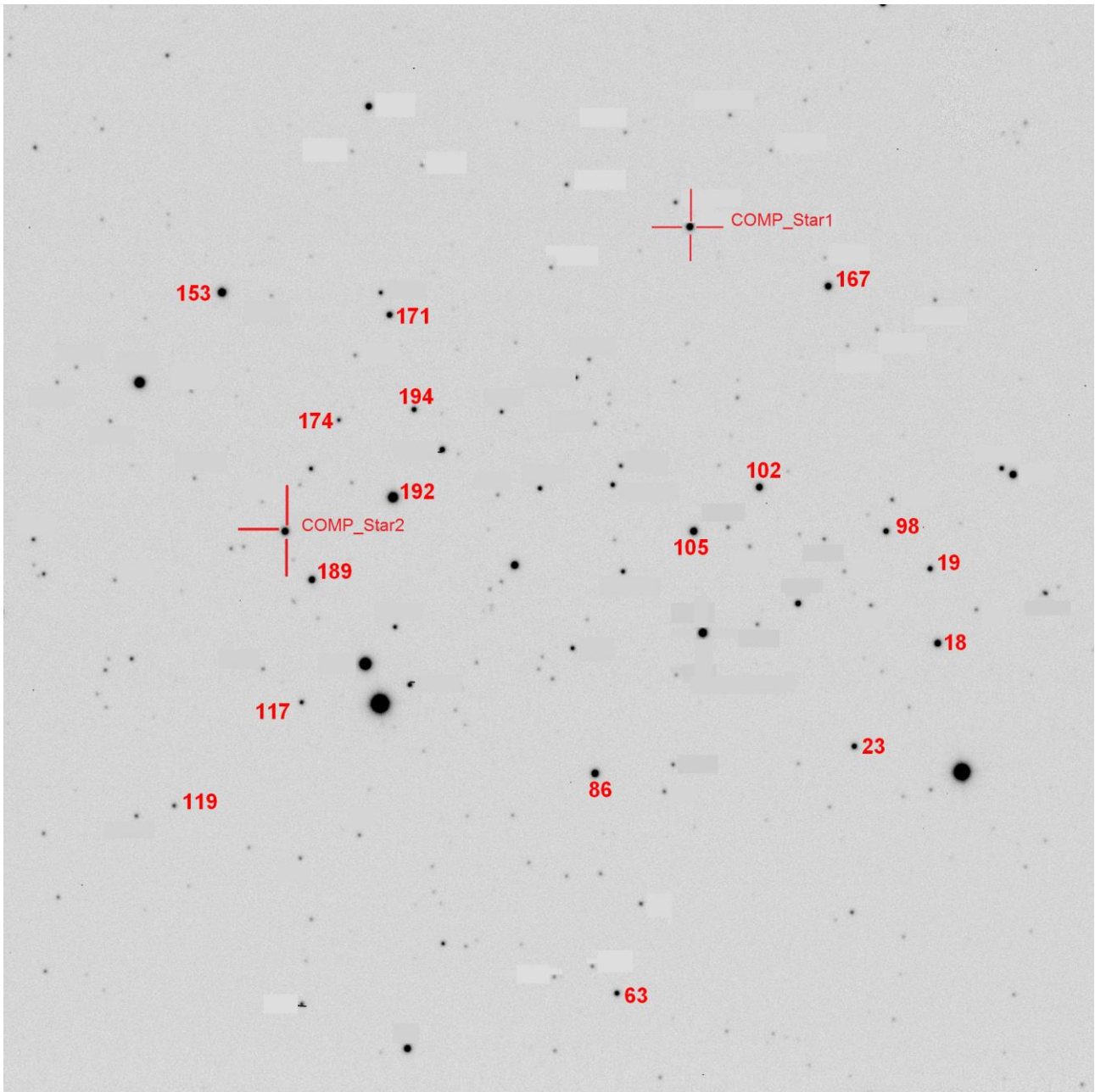
17 étoiles sélectionnées à partir de l'article précédent dans la liste des "membres possibles" de l'amas permettant une bonne photométrie (bord de champ, étoiles proches, magnitude suffisante en B...). Ces étoiles sont ensuite identifiées dans le catalogue AAVSO Photometric All Sky Survey (APASS) DR9 (Henden+, 2016)

17 stars selected from the previous article in the list of "possible members" of the cluster allowing good photometry (field edge, nearby stars, sufficient magnitude in B ...). These stars are then identified in the catalog AAVSO Photometric All Sky Survey (APASS) DR9 (+ Henden, 2016)

COMP_Star1, id: UCAC4 739-025148, magnitudes APASS Bmag = 12.871 Vmag = 12.057

COMP_Star2, id: UCAC4 738-026720, magnitudes APASS Bmag = 12.556 Vmag = 12.045





Estimation de la FWHM avec le logiciel IRIS et l'outil PSF sur les étoiles du champ des images. On obtient FWHM~7 pixels

Estimating the FWHM with IRIS software and PSF tool on the stars of the image field. FWHM ~ 7 pixels is obtained

En respectant les indications fournies par l'AAVSO
<https://www.aavso.org/ccd-photometry-gude>
 Chapitre 5 page 44

By following the guidance provided by the AAVSO
<https://www.aavso.org/ccd-photometry-gude>
 Chapter 5, page 44

Le rayon d'ouverture des étoiles doit être de 3 à 4 fois le FWHM, R1 = 21 pixels
 Le rayon du cercle intérieur doit être d'environ 10 pixels plus grand, R2 = 30 pixels
 L'anneau extérieure est ajusté pour éviter des étoiles du champ, R3 = 12 pixels

The radius of the star aperture should be 3 to 4 times the FWHM, R1 = 21 pixels
 The radius of the inner circle should be about 10 pixels across, R2 = 30 pixels
 The outer ring is adjusted to avoid field stars, R3 = 12 pixels

J'utilise le logiciel de photométrie Malaki'i

I use the photometric software Makali'i

<https://makalii.mtk.nao.ac.jp/>

Je mesure la luminosité de chaque étoile sélectionnée avec les réglages cités plus haut dans les images en bleu et en vert en respectant le même ordre.

I measure the brightness of each selected star with the settings mentioned above in the images in blue and green in the same order.

Puis je mesure la luminosité en bleu et en vert des deux étoiles de comparaison choisies.

Then I measure the brightness in blue and green of the two selected comparison stars.

Les valeurs sont ensuite reportées dans la feuille de calcul inspirée de http://faulkes-telescope.com/files/faulkes-telescope.com/archive/photometry/Lifecycle_stars/CMD_plotter_SR.xls

The values are then reported in the spreadsheet inspired by : http://faulkes-telescope.com/files/faulkes-telescope.com/archive/photometry/Lifecycle_stars/CMD_plotter_SR.xls

Mesures

Measures

Première nuit, première étoile de comparaison

First night, first comparison star

APASS			instr/APASS		INSTR		
B	V	B-V	delta B	delta V	B corrected	V corrected	B-V corrected
12.782	12.213	0.569	0.02934093	-0.00525835	12.808	12.215	0.593
13.804	13.139	0.665	0.03962323	0.00952571	13.844	13.149	0.695
13.955	12.822	1.133	-0.08172586	0.02673786	13.873	12.849	1.025
13.691	12.99	0.701	-0.01521742	-0.03212556	13.676	12.958	0.718
12.825	12.249	0.576	0.03076946	0.00615002	12.856	12.255	0.601
12.808	12.199	0.609	0.01325175	-0.02182497	12.821	12.177	0.644
12.406	11.864	0.542	0.04990827	-0.01864219	12.456	11.845	0.611
13.769	13.244	0.524	0.06658591	-0.00960561	13.836	13.234	0.601
12.414	11.87	0.544	0.04317411	-0.00897693	12.457	11.861	0.596
13.912	13.244	0.669	-0.05641158	0.00083761	13.856	13.245	0.611
11.126	10.627	0.499	0.02342229	-0.02165262	11.149	10.605	0.544
13.458	12.807	0.651	-0.02814538	0.02767471	13.430	12.835	0.595
14.75	14.062	0.688	-0.00480195	0.03624542	14.745	14.098	0.647
12.844	12.28	0.564	0.01426188	-0.01557438	12.858	12.264	0.594
14.52	13.762	0.758	-0.06735599	-0.00674467	14.453	13.755	0.697
11.971	11.442	0.529	0.02296113	-0.01451371	11.994	11.427	0.566
14.954	14.318	0.636	-0.03003343	-0.07756467	14.924	14.240	0.684
		average	0.00291808	-0.00737131			

Première nuit, deuxième étoile de comparaison First night, second comparison star

APASS			instr/APASS		INSTR		
B	V	B-V	delta B	delta V	B corrected	V corrected	B-V corrected
12.782	12.213	0.569	0.03684984	-0.02887136	12.771	12.187	0.584
13.804	13.139	0.665	0.02148773	0.00287422	13.825	13.142	0.684
13.955	12.822	1.133	-0.06464862	0.02232035	13.890	12.844	1.046
13.691	12.99	0.701	-0.01856857	-0.01093714	13.672	12.979	0.693
12.825	12.249	0.576	0.08851192	0.01712559	12.914	12.266	0.647
12.808	12.199	0.609	0.06544085	0.00550198	12.873	12.205	0.669
12.406	11.864	0.542	0.06102452	-0.01013206	12.467	11.854	0.613
13.769	13.244	0.524	0.06693008	-0.02905284	13.836	13.215	0.621
12.414	11.87	0.544	0.06900144	-0.00412162	12.483	11.866	0.617
13.912	13.244	0.669	0.03639587	-0.01102815	13.948	13.233	0.715
11.126	10.627	0.499	0.07701778	-0.01895758	11.203	10.608	0.595
13.458	12.807	0.651	-0.01176486	-0.00852275	13.446	12.798	0.648
14.75	14.062	0.688	0.13986586	0.07572287	14.890	14.138	0.752
12.844	12.28	0.564	0.07501003	-0.0134281	12.919	12.267	0.652
14.52	13.762	0.758	0.13513483	0.01556659	14.655	13.778	0.878
11.971	11.442	0.529	0.05759279	-0.01393684	12.029	11.428	0.601
14.954	14.318	0.636	-0.02026152	-0.04255649	14.934	14.275	0.658
		average	0.04794235	-0.00308431			

Deuxième nuit, première étoile de comparaison Second night, first comparison star

APASS			instr/APASS		INSTR		
B	V	B-V	delta B	delta V	B corrected	V corrected	B-V corrected
12.782	12.213	0.569	0.02044659	0.041328	12.808	12.215	0.593
13.804	13.139	0.665	0.03072889	0.05611206	13.835	13.195	0.640
13.955	12.822	1.133	-0.0906202	0.07332421	13.864	12.895	0.969
13.691	12.99	0.701	-0.02411177	0.01446079	13.667	13.004	0.662
12.825	12.249	0.576	0.02187512	0.05273636	12.847	12.302	0.545
12.808	12.199	0.609	0.0043574	0.02476138	12.812	12.224	0.589
12.406	11.864	0.542	0.04101393	0.02794415	12.447	11.892	0.555
13.769	13.244	0.524	0.05769156	0.03698074	13.827	13.281	0.546
12.414	11.87	0.544	0.03427976	0.03760942	12.448	11.908	0.541
13.912	13.244	0.669	-0.06530592	0.04742396	13.847	13.291	0.555
11.126	10.627	0.499	0.01452795	0.02493372	11.141	10.652	0.489
13.458	12.807	0.651	-0.03703972	0.07426106	13.421	12.881	0.540
14.75	14.062	0.688	-0.01369629	0.08283177	14.736	14.145	0.591
12.844	12.28	0.564	0.00536753	0.03101197	12.849	12.311	0.538
14.52	13.762	0.758	-0.07625033	0.03984168	14.444	13.802	0.642
11.971	11.442	0.529	0.01406679	0.03207264	11.985	11.474	0.511
14.954	14.318	0.636	-0.03892778	-0.03097832	14.915	14.287	0.628
		average	-0.00597626	0.03921503			

Deuxième nuit, deuxième étoile de comparaison Second night, second comparison star

APASS			instr/APASS		INSTR		
B	V	B-V	delta B	delta V	B corrected	V corrected	B-V corrected
12.782	12.213	0.569	-0.01887304	-0.00450931	12.780	12.190	0.590
13.804	13.139	0.665	-0.05780635	0.03306147	13.746	13.172	0.574
13.955	12.822	1.133	-0.1341671	0.04313116	13.821	12.865	0.956
13.691	12.99	0.701	-0.05819649	0.00726325	13.633	12.997	0.636
12.825	12.249	0.576	0.03406145	0.04251021	12.859	12.292	0.568
12.808	12.199	0.609	0.00803527	0.0294158	12.816	12.228	0.588
12.406	11.864	0.542	0.01085515	0.01410517	12.417	11.878	0.539
13.769	13.244	0.524	-0.0114777	-0.00946066	13.758	13.235	0.523
12.414	11.87	0.544	0.01543518	0.01811498	12.429	11.888	0.541
13.912	13.244	0.669	-0.04578482	0.01150555	13.866	13.256	0.611
11.126	10.627	0.499	0.0212949	0.00389439	11.147	10.631	0.516
13.458	12.807	0.651	-0.10609017	0.02069147	13.352	12.828	0.524
14.75	14.062	0.688	0.07383621	0.09857484	14.824	14.161	0.663
12.844	12.28	0.564	0.01316748	0.01004675	12.857	12.290	0.567
14.52	13.762	0.758	0.07941195	0.01950147	14.599	13.782	0.818
11.971	11.442	0.529	0.00186991	0.00810932	11.973	11.450	0.523
14.954	14.318	0.636	-0.11056483	-0.02597865	14.843	14.292	0.551
		average	-0.01676429	0.01882219			

En faisant la moyenne des écarts entre les mesures instrumentales et les données du catalogue APASS pour les deux nuits et les deux étoiles de comparaison, j'obtiens:

By averaging the differences between the instrumental measurements and the data of the APASS catalog for the two nights and the two comparison stars, I get:

instr/APASS	
delta B	delta V
0.00291808	-0.00737131
0.04794235	-0.00308431
-0.00597626	0.03921503
-0.01676429	0.01882219
+0.00702997	+0.0118953

delta B = +0.007 et delta V = +0.012