

Using UCAC4/APASS All Sky Catalog to Perform Standard Passband Photometry of Unfiltered Images

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This article characterizes the quality of photometric measurements that can be made from **unfiltered** CCD images using the APASS photometric all sky catalog as a reference.

In a previous article* the author demonstrated that instrumental magnitudes measured from unfiltered CCD images of a well calibrated star field can be accurately transformed into standard photometric passband magnitudes.

* “Using Unfiltered Images to Perform Standard Filter Band Photometry”
JAAVSO Volume 45 number 1 (2017)
<https://www.aavso.org/apps/jaavso/article/3194/>

To assess the quality of this technique for general photometry, the APASS all sky catalog was used as a reference in eight separate star fields. Unfiltered images of M-67 and 7 Landolt star fields were made. The instrumental magnitudes of suitable stars within each image, having APASS data, were measured. Transformations to the standard B, V, r', i' magnitudes were then made for each star field.

Jumping to conclusions >>> To be presented in full<<<

The standard deviations of the residuals (F - f) are shown in **Table 1** for M-67 stars and **Table 2** for Landolt field stars. After removal of the evident outliers, the transformation of the unfiltered instrumental magnitudes to the APASS B V r' i' are accurate to a standard deviation of 0.025 magnitude or better for the M-67 field and better than 0.037 for the consolidated Landolt fields.

46 transformed M-67 Stars				
Std Dev of	B - b	V - v	r' - r	i' - i
Residual (F - f) =	0.023	0.023	0.025	0.025

Table 1

113 transformed Landot Field Stars				
Std Dev of	B - b	V - v	r' - r	i' - i
Residual (F - f) =	0.035	0.035	0.036	0.037

Table 2

Within each of the star fields, there are reference stars calibrated to Landolt quality. This allows an evaluation against known standard stars for the magnitudes derived from unfiltered images

using the APASS data as reference. This evaluation is essentially a comparison of the APASS catalog magnitudes to the M-67 AAVSO-VSP catalog magnitudes and the APASS catalog magnitudes compared to the various Landolt star magnitudes within the several measured Landolt fields.

The results of the comparisons are presented in Tables 3 and 4.

M-67 VSP magnitudes vs APASS derived magnitudes

	Std Dev of (vsp F - apass f)				Measured Stars
Filter Band	B	V	R	I	
Residuals	B - b	V - v	R - r'	I - i'	
Std Dev =	0.027	0.019	0.036	0.034	Outliers Removed
	57	57	55	54	APASS Stars measured

Table 3

Landolt magnitudes vs APASS derived magnitudes

	Std Dev of (Landolt F - apass f)			Measured Stars
Filter Band	B	V	R	
Residuals	B - b	V - v	R - r'	
Std Dev =	0.028	0.023	0.044	Outliers Removed
	41	44	41	Landolt Stars

Table 4