

Notes on How to Use TransformApplier

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Introduction

TransformApplier is a utility written by George Silvis that allows batch transformation of variable star data into the standard system. As is usually when I learn a new software program, I took detailed note on procedures as I learned the program. This document is the result. I have always found that having a test file assures that first users of new software benefit from duplicating “known” results and have made available a set of data and the output for comparison as a separate zip file that contains various txt files. There are parts of the program I have not investigated, as noted. I also provide some notes on what I consider a valuable subprogram, “TestTC.” However, George is still working on this part of the program suite, so my notes on TestTC should be viewed as preliminary and written in the spirit of “if its there someone will try to use it.”

1. Download and open TransformApplier.

TransformApplier is one of three software packages offered at <https://www.aavso.org/transform>. The link is in the Data Analysis set of pages at <https://www.aavso.org>. The download consists of an executable file TransformApplier.exe.

2. Organization.

There is a single high-level pull-down “File” menu including commands that can input an AAVSO formatted file, and various save functions that allow downloading of reports, etc. as text files.

Open un-transformed obs file. Unless you are doing a single filter transformation you would load two (2) files, one for each filter. See tutorial.

Save un-transformed obs to file. Use this to save the combined file, for example, if you input a series of B-filter and V-filter data you would get out a single text file that combines both.

Save transformed obs to file. This save the output in the window Application – The transformed records are here... into a txt file tagged TA and suitable for downloading in WebObs.

Save report to file. Save the information on the Report page. Note that this is NOT a report suitable for WebObs, see below.

3. Windows.

There are five windows in TransformApplier, each accessed by tabs of the same name and each containing either text boxes or forms.

Application. Upper text box for entering data. Lower text box presents the results of the analysis in a format that can be read by WebObs when saved.

Report. Presents, in the text box, the results of the transformation in such terms as the difference between transformed and untransformed results. This is not a WebObs-compliant report, as detailed below.

Coefficients. A form window that allows you to enter the transformation coefficients. Note that this uses AAVSO transform notation. Also note the error terms are used. See Help for information on error terms. You should generate a *.ini file to hold each set of coefficients (**save as** button) and can call up any set with the **change** button.

Extinction. A form window allowing input of extinction terms. Consult Help for information and the need to enter or disregard extinction terms.

Help. Read this too!

4. Operation – Application Window

Data input. You may either open from File or paste your untransformed data into the upper text box. Note that the test data have the check and comp star names in the example data (125 and 120 in this case) are changed to their AUID numbers. This is usually not needed as the program will correctly read these stars based on the AAVSO chart number.

Methodology. The Help menu outlined three different methodologies depending on alternate transformation equations (AAVSO, Alternate, Classic). Be informed on which you use. The tutorial uses AAVSO.

DSLR is for WebObs-compatible DSLR transformation reports. Data submitted from a DSLR will have filters TB, TG and TR. Checking this box tells TA to use B, V and R reference data.

Test TC can be used to test how well your transformation coefficients perform given a set of data from a standard star or stars, a valuable check on TC coefficients. The current version is a beta version, use with caution.

Aggregate will aggregate observations according to the criteria outlined in the Help file. This might be used for slow-changing M-class variables but not for eclipsing binaries or other variables that vary over short time periods. The tutorial has a set of data on an eclipsing binary, thus Aggregate is not used.

Standard Field is checked if you are using a chart of a standard field (e.g. M67). I have not used this feature.

Process begins the analysis, with intermediate output shown in the lower text box.

5. Save the file as a WebObs compatible file

Use “File → Save transformed obs to file” to download a report as a WebObs-compatible txt file. You are now ready to report your transformed data to AAVSO. A copy of the result of the example data is in the folder, see tutorial below. Please do not report these data to AAVSO.

6. The Report Window

The Report window's text box is NOT the text box that will generate a WebObs report when the txt file is saved; you have already done this in (5.) above. Rather, it provides information on the transformations, observation by observation. For example, below:

Star	Date	Filter Grp	Vraw	Vinst	Vex	TranMag	diff	VERR	VERRt
"V0347 Dra	2458285.69267	B 0101	13.501	-7.176	-7.176	13.553	0.05165	0.006	0.007

Vraw: measured standardized magnitude from the input record.

Vinst: the raw instrumental magnitude, backing out the standardization

Vex: Vinst with extinction applied. No change if not applying extinction

TranMag: The magnitude after transformation

Diff: difference between untransformed and transformed magnitude

Verr: magnitude error as reported from the input record

Verrt: magnitude error for the transformed magnitude

6. Using the Test TC utility

George Silvis considers the "Test TC" utility to be a beta version, so its use must be considered with caution and the expectation that further improvements and additional information on proper use will be made as he has time. I used the current version and found it to have considerable potential in its primary function; checking the quality of transformation coefficients. It takes the check star measures and instrumental magnitude, transforms the data, and then compares the transformed value against itself as found in the AAVSO photometry table. The check star is considered a secondary standard; the difference should be an indication of the success of the transformation coefficients to successfully transform the measured value to the standard system. Since the standard magnitude of the check star is associated with an uncertainty, one might expect that the differences ("diff" column in the Transform Coefficient Test Report) to fall within some range given the uncertainty.

The following **is not** a definitive method for determining the validity of your transformation series, it is my attempt to understand that output. After running TestTC, I copied the Report page to a text file and saved it as "TestTC_Report" (included in the zip file). I noted from the Photometry Table that the check star 125 (AIUD 000-BMR-476) is an APASS star with an uncertainty of +/- 0.042 in Johnson B and +/- 0.020 in Johnson V.

If you examine all the range of difference (diff) data for both Johnson B and Johnson V, you will note that all but one observation in each filter fall within two standard deviations of the uncertainty. Further, the two that deviate more than 2Sd are the last of each pair, indicating a common cause for the deviation. If you average all the differences except the last for each filter you find that the average for B is slightly over the published uncertainty while the average for V is slightly under the average uncertainty. Both observations indicate to me that the transformation coefficients for these filters are useful.

Acknowledgement: I thank George Silvis for patiently answering my many questions about TransformApplier.

Tutorial example

A series of B and V observations were made of V0347 Dra, an eclipsing binary after an eclipse as part of a period study by WEY and colleagues. The two observation files and a file of results are included in the zip file.

1. Unzip the file and example the data. Note that I have substituted the AUID values for comp star 120 and check star 125. Do not do this with your data unless necessary.

2. Open TransformApplier.

3. Open the Coefficients window and copy the information below.

		Coefficient	Error
Tub	1/slope of (u-b) vs (U-B)	0.0000	0.0000
Tbv	1/slope of (b-v) vs (B-V)	1.2115	0.0050
Tbr	1/slope of (b-r) vs (B-R)	0.0000	0.0000
Tbi	1/slope of (b-i) vs (B-I)	0.0000	0.0000
Tvr	1/slope of (v-r) vs (V-R)	0.0000	0.0000
Tvi	1/slope of (v-i) vs (V-I)	1.0318	0.0005
Tri	1/slope of (r-i) vs (R-I)	0.0000	0.0000
Tu_ub	slope of (U-u) vs (U-B)	0.0000	0.0000
Tb_bv	slope of (B-b) vs (B-V)	0.1078	0.0050
Tb_br	slope of (B-b) vs (B-R)	0.0000	0.0000
Tb_bi	slope of (B-b) vs (B-I)	0.0000	0.0000
Tv_vr	slope of (V-v) vs (V-R)	0.0000	0.0000
Tv_vi	slope of (V-v) vs (V-I)	0.0000	0.0000
Tr_ri	slope of (R-r) vs (R-I)	0.0000	0.0000
Tv_bv	slope of (V-v) vs (B-V)	-0.0531	0.0010
Tr_bv	slope of (R-r) vs (B-V)	0.0000	0.0000
Ti_bv	slope of (I-i) vs (B-V)	0.0000	0.0000
Tr_vr	slope of (R-r) vs (V-R)	0.0000	0.0000
Tr_vi	slope of (R-r) vs (V-I)	0.0000	0.0000
Ti_vi	slope of (I-i) vs (V-I)	-0.0918	0.0050

3. Open the Application Window. Using File, open the two files of data, one after the other. The data will appear in the upper text box. Scroll down to ensure that both data files are in the box.

4. Select **AAVSO Methodology**. Make sure that other options are not selected (DSLRL, etc.) and then select Process.

5. The results will appear in the lower text box. Save these results (File → Save transformed obs to file). This file will be named “AAVSOReport_V0347-Dra_V_20180624_TA” with the “V” after the second file of data loaded. A copy is in the example folder. A screen shot of the Application window with part of these data is shown below.

TA, the AAVSO Transform Applier application, version 2.49

File

Application | Report | Coefficients | Extinction | Help

Clear Paste your un-transformed AAVSO records here 2.49 is the latest version of TA

Methodology

- AAVSO
- Alternate
- Classic

DSLR

Test TC

Aggregate

Process

To Clipboard

Save

UseStdField

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V0347 Dra,2458285.83492,13.436,0.006,B,NO,STD,120,-7.874,125,-7.125,1.35598,0,X23038DI,16June2018-B
V0347 Dra,2458285.83922,13.448,0.007,B,NO,STD,120,-7.673,125,-6.924,1.36959,0,X23038DI,16June2018-B
V0347 Dra,2458285.84775,13.437,0.007,B,NO,STD,120,-7.823,125,-7.045,1.39153,0,X23038DI,16June2018-B
V0347 Dra,2458285.85950,13.426,0.008,B,NO,STD,120,-7.406,125,-6.622,1.44004,0,X23038DI,16June2018-B
V0347 Dra,2458285.85998,13.450,0.007,B,NO,STD,120,-7.777,125,-6.981,1.62253,0,X23038DI,16June2018-B
V0347 Dra,2458285.89992,13.388,0.011,B,NO,STD,120,-6.935,125,-6.209,1.64590,0,X23038DI,16June2018-B
#TYPE=EXTENDED
#OBSCODE=WEY
#SOFTWARE=VPhot 4.0.1
#DELIM=,
#DATE=JD
#OBSSTYPE=CCD
#NAME, DATE, MAG, MERR, FILT, TRANS, NTYPE, CNAME, CMAG, KNAME, KMAG, MAMAG, GROUP, CHART, NOTES
V0347 Dra,2458285.69398,12.553,0.005,V,NO,STD,120,-8.526,125,-8.363,1.18697,0,X23038DI,16June2018-V
V0347 Dra,2458285.69833,12.563,0.005,V,NO,STD,120,-8.522,125,-8.352,1.18537,0,X23038DI,16June2018-V
V0347 Dra,2458285.70264,12.559,0.005,V,NO,STD,120,-8.893,125,-8.332,1.18423,0,X23038DI,16June2018-V
V0347 Dra,2458285.70694,12.580,0.005,V,NO,STD,120,-8.867,125,-8.307,1.18344,0,X23038DI,16June2018-V
V0347 Dra,2458285.71130,12.589,0.005,V,NO,STD,120,-8.869,125,-8.287,1.18309,0,X23038DI,16June2018-V
V0347 Dra,2458285.71948,12.580,0.005,V,NO,STD,120,-8.829,125,-8.239,1.18352,0,X23038DI,16June2018-V

The transformed records are here after you hit the Process button

V0347 Dra,2458285.82753,12.500,0.005,V,YES,STD,000-BMR-475,-8.777,000-BMR-476,-8.211,1.3342,0131,X23038DI,16June2018-V|VMAGINS=-8.216|VERR:
# BV, AAVSO recommended using: B @ 2458285.82623, V @ 2458285.82753
V0347 Dra,2458285.83189,12.511,0.005,V,NO,STD,000-BMR-475,-8.747,000-BMR-476,-8.188,1.34684,0,X23038DI,16June2018-V
V0347 Dra,2458285.83189,12.487,0.005,V,YES,STD,000-BMR-475,-8.747,000-BMR-476,-8.188,1.3468,0132,X23038DI,16June2018-V|VMAGINS=-8.198|VERR:
# BV, AAVSO recommended using: B @ 2458285.83057, V @ 2458285.83189
V0347 Dra,2458285.83624,12.500,0.006,V,NO,STD,000-BMR-475,-8.663,000-BMR-476,-8.106,1.36016,0,X23038DI,16June2018-V
V0347 Dra,2458285.83624,12.475,0.006,V,YES,STD,000-BMR-475,-8.663,000-BMR-476,-8.106,1.3602,0133,X23038DI,16June2018-V|VMAGINS=-8.125|VERR:
# BV, AAVSO recommended using: B @ 2458285.83492, V @ 2458285.83624
V0347 Dra,2458285.84050,12.510,0.006,V,NO,STD,000-BMR-475,-8.573,000-BMR-476,-8.007,1.37390,0,X23038DI,16June2018-V
V0347 Dra,2458285.84050,12.485,0.006,V,YES,STD,000-BMR-475,-8.573,000-BMR-476,-8.007,1.3739,0134,X23038DI,16June2018-V|VMAGINS=-8.025|VERR:
# BV, AAVSO recommended using: B @ 2458285.83922, V @ 2458285.84050
V0347 Dra,2458285.84909,12.520,0.006,V,NO,STD,000-BMR-475,-8.618,000-BMR-476,-8.032,1.40399,0,X23038DI,16June2018-V
V0347 Dra,2458285.84909,12.497,0.006,V,YES,STD,000-BMR-475,-8.618,000-BMR-476,-8.032,1.4040,0135,X23038DI,16June2018-V|VMAGINS=-8.060|VERR:
# BV, AAVSO recommended using: B @ 2458285.84775, V @ 2458285.84909
V0347 Dra,2458285.86263,12.510,0.008,V,NO,STD,000-BMR-475,-8.124,000-BMR-476,-7.524,1.45299,0,X23038DI,16June2018-V
V0347 Dra,2458285.86263,12.487,0.008,V,YES,STD,000-BMR-475,-8.124,000-BMR-476,-7.524,1.4530,0136,X23038DI,16June2018-V|VMAGINS=-7.576|VERR:
# BV, AAVSO recommended using: B @ 2458285.85950, V @ 2458285.86263
V0347 Dra,2458285.89716,12.493,0.009,V,NO,STD,000-BMR-475,-7.884,000-BMR-476,-7.272,1.62951,0,X23038DI,16June2018-V
V0347 Dra,2458285.89716,12.467,0.009,V,YES,STD,000-BMR-475,-7.884,000-BMR-476,-7.272,1.6295,0137,X23038DI,16June2018-V|VMAGINS=-7.353|VERR:
# BV, AAVSO recommended using: B @ 2458285.89598, V @ 2458285.89716
V0347 Dra,2458285.90110,12.486,0.019,V,NO,STD,000-BMR-475,-7.072,000-BMR-476,-6.549,1.65331,0,X23038DI,16June2018-V
V0347 Dra,2458285.90110,12.463,0.019,V,YES,STD,000-BMR-475,-7.072,000-BMR-476,-6.549,1.6533,0138,X23038DI,16June2018-V|VMAGINS=-6.548|VERR:
# BV, AAVSO recommended using: B @ 2458285.89992, V @ 2458285.90110

```

6. Below is a screen shot of the Report text box, again, note that this is not the window for reporting data to WebObs, it is a report of the transformation process.

Application Report		Coefficients		Extinction		Help					
Clear		To Clipboard									
Star		Date	Filter Grp	Vraw	Vinst	Vex	TranMag	diff	VERR	VERRt	
"V0347 Dra	"	2458285.69267	B 0101	13.501	-7.176	-7.176	13.553	0.05165	0.006	0.007	
"V0347 Dra	"	2458285.69703	B 0102	13.488	-7.193	-7.193	13.537	0.04870	0.006	0.006	
"V0347 Dra	"	2458285.70132	B 0103	13.503	-7.167	-7.167	13.554	0.05114	0.006	0.007	
"V0347 Dra	"	2458285.70567	B 0104	13.501	-7.127	-7.127	13.549	0.04818	0.006	0.006	
"V0347 Dra	"	2458285.70998	B 0105	13.505	-7.122	-7.122	13.553	0.04754	0.006	0.006	
"V0347 Dra	"	2458285.71816	B 0106	13.493	-7.062	-7.062	13.540	0.04715	0.006	0.006	
"V0347 Dra	"	2458285.72251	B 0107	13.511	-7.145	-7.145	13.560	0.04908	0.006	0.006	
"V0347 Dra	"	2458285.72686	B 0108	13.514	-7.119	-7.119	13.563	0.04921	0.006	0.006	
"V0347 Dra	"	2458285.73120	B 0109	13.505	-7.086	-7.086	13.554	0.04947	0.006	0.006	
"V0347 Dra	"	2458285.73556	B 0110	13.495	-7.027	-7.027	13.541	0.04587	0.006	0.006	
"V0347 Dra	"	2458285.73981	B 0111	13.485	-7.038	-7.038	13.533	0.04754	0.006	0.006	
"V0347 Dra	"	2458285.74417	B 0112	13.485	-7.066	-7.066	13.533	0.04792	0.006	0.006	
"V0347 Dra	"	2458285.74847	B 0113	13.468	-7.041	-7.041	13.515	0.04715	0.006	0.006	
"V0347 Dra	"	2458285.75277	B 0114	13.460	-6.958	-6.958	13.506	0.04600	0.006	0.006	
"V0347 Dra	"	2458285.75712	B 0115	13.470	-7.021	-7.021	13.518	0.04831	0.006	0.006	
"V0347 Dra	"	2458285.76147	B 0116	13.457	-7.034	-7.034	13.504	0.04715	0.006	0.006	
"V0347 Dra	"	2458285.76582	B 0117	13.455	-6.938	-6.938	13.500	0.04523	0.006	0.006	
"V0347 Dra	"	2458285.77017	B 0118	13.465	-6.894	-6.894	13.515	0.04959	0.006	0.006	
"V0347 Dra	"	2458285.77448	B 0119	13.457	-6.940	-6.940	13.506	0.04882	0.006	0.006	
"V0347 Dra	"	2458285.77878	B 0120	13.461	-7.013	-7.013	13.510	0.04947	0.006	0.006	
"V0347 Dra	"	2458285.78309	B 0121	13.460	-7.041	-7.041	13.507	0.04677	0.006	0.006	
"V0347 Dra	"	2458285.78744	B 0122	13.470	-7.071	-7.071	13.519	0.04895	0.006	0.006	
"V0347 Dra	"	2458285.79179	B 0123	13.439	-7.090	-7.090	13.484	0.04523	0.006	0.006	
"V0347 Dra	"	2458285.79609	B 0124	13.449	-7.076	-7.076	13.496	0.04715	0.006	0.006	
"V0347 Dra	"	2458285.80044	B 0125	13.457	-7.072	-7.072	13.506	0.04908	0.006	0.006	
"V0347 Dra	"	2458285.80475	B 0126	13.453	-7.094	-7.094	13.501	0.04818	0.006	0.006	
"V0347 Dra	"	2458285.80905	B 0127	13.471	-7.108	-7.108	13.519	0.04792	0.006	0.006	
"V0347 Dra	"	2458285.81336	B 0128	13.461	-7.106	-7.106	13.509	0.04844	0.006	0.006	
"V0347 Dra	"	2458285.81770	B 0129	13.441	-7.088	-7.088	13.490	0.04934	0.006	0.006	
"V0347 Dra	"	2458285.82196	B 0130	13.461	-7.060	-7.060	13.511	0.04985	0.006	0.006	
"V0347 Dra	"	2458285.82623	B 0131	13.434	-7.040	-7.040	13.481	0.04690	0.006	0.006	
"V0347 Dra	"	2458285.83057	B 0132	13.439	-7.008	-7.008	13.488	0.04908	0.006	0.006	
"V0347 Dra	"	2458285.83492	B 0133	13.436	-6.946	-6.946	13.486	0.05011	0.006	0.007	
"V0347 Dra	"	2458285.83922	B 0134	13.448	-6.733	-6.733	13.498	0.05037	0.007	0.007	

Checking the quality of your transforms

1. To reduce clutter clear the Report screen.
2. Simple run the data again with the "Test TC" button activated.
3. Scroll down to the bottom of the Report page to view the results.
4. As TestTC is in beta version, interpretation of results should be cautious and preliminary.