Instructions for using SAGFITn macro

Note: The character n is simply a number to distinguish new versions of the macro from old ones. Current version is **SAGFIT6.SEQ** as of August 2014.

The macro **SAGFITn** will fit a Code V surface (any surface type) to a table of sag data that is either

- A tab-delimited data file (ASCII text file), or
- In a Worksheet Buffer.

The data can be Y Z data in 2 columns, or X Y Z data in 3 columns (Z is the sag). If the data is in a file, the file should be a tab-delimited. You can have one or more comment lines at the beginning of the file; lines that don't begin with a number are treated as comment lines.

When you run **SAGFITn**, it
- Reads the data file, if necessary, and stores the data in a Worksheet Buffer,
- Sets up a 2-surface "optical system" where surface 1 is a flat reference surface and surface 2 is the surface that gets optimized to fit the data, and
- Creates another macro file called **SAGFITAUT.SEQ**, which is the macro that you will run to actually optimize the surface shape.

Important: SAGFITn discards the current optical system!

SAGFITAUT contains the **AUT** commands that do the surface fitting via the User-Defined Error Function feature. You will probably need to run SAGFITAUT more than once. You can change the number of variables on the surface that you're fitting or even change the surface type, and re-run **SAGFITAUT** until you get a satisfactory fit. **SAGFITAUT** displays the RMS fit error after it optimizes. You're also free to edit **SAGFITAUT.SEQ** if you like (larger MXC, smaller IMP, etc.).

If your measured sag data is for a rotationally symmetric surface, especially if it covers a range of X & Y that encloses the vertex (i.e., X=Y=0), you should allow the fitted surface to tilt and/or decenter by varying XDE, YDE, ADE, & BDE on surface 2. This allows for possible decentration and tilt of the surface when it was measured.

Also included in the .zip file are a few ancillary macros:
PLOT_SAGFIT_RESIDUALS plots the fitting residuals of a 2-D data set (Z error vs. Y) after the fit is done, so you can examine the fit quality visually.
PLOT_SAGFIT_RESIDUALS_VS_X plots the fitting residuals of a 3-D data set (Z error vs. X)

PLOT_SAGFIT_RESIDUALS_VS_Y plots the fitting residuals of a 3-D data set (Z error vs. Y)

WRL_SAGFIT_SURFACE_DATA creates commands (displayed on the screen and also written to a .SEQ file) that makes it easy to transfer the parameters for the fitted surface back to the CODE V setup of your real optical system.

SAGFITn does create some global macro variables that are also used by **SAGFITAUT** and the other ancillary macros:

Variable name	Type	Purpose
^UDS_DLL_NAME	STR	name of DLL file if you're fitting a UDS
^SURFTYPE	STR	Code V surface type, as a string
^FILENAME	STR	Name of file that you read data from, or buffer number as string
^NUMCOLS	NUM	Number of columns of data (2 or 3)
^FIRSTLINE	NUM	Row of file where numeric data begins
^NUMPTS	NUM	Number of data points
^SAGBUF	NUM	Number of buffer that contains the sag data

Two sample sag data files are included in the .zip file. You can export such files from Excel if you like.

For more information on using the **SAGFITn** macro, please refer to the comments included in the header of the **SAGFITn.SEQ** file itself.