Lesson 1. Entering a lens file

SYNOPSYS has a spreadsheet that you can use to enter lens data -- but we almost never use it since it is so much faster and easier to do it with the keyboard. Here's how:
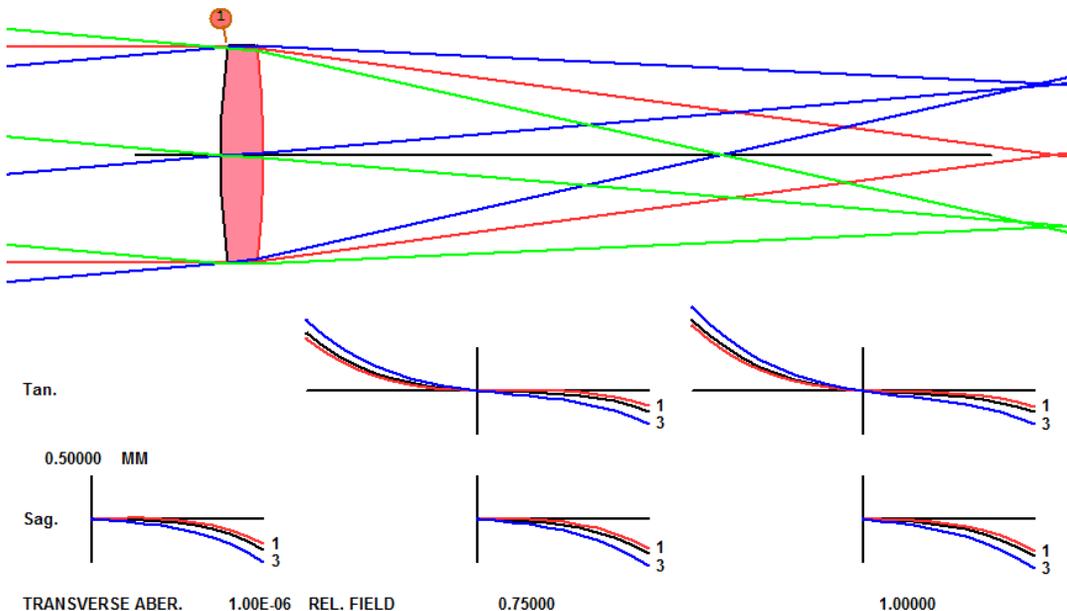
When the program opens, type, in the Command Window (**CW**),

> **EE**

This will open the Excellent Editor, where you can type the following:

Click the run button, , and then click the PAD button in the top toolbar, or type **PAD.** The lens picture shows up along with TAP ray fans curves.


The meaning of the entries in the RLE file should be self-evident, except for the OBB line, which declares the object coordinates. The three arguments give the entering marginal ray angle UA (which is zero for an infinite object), 5 degrees semi-field angle UB, and 12.7 mm for the semi aperture YA. This is all explained in the menus **MPW** (Menu, Pupil Wizard) and **MOW** (Menu, Object Wizard), which you should examine when you have time. And of course it is all spelled out in the Tutorial Manual, which you have already read. Right?

Some people prefer to enter lens data with the SpreadSheet, and you can open it with the command **SPS**. But to enter this simple singlet, one must then execute no less than 17 different mouse clicks and type into several boxes. We find that entering the data with the EE editor as shown above is many times faster and easier. Users of other programs sometimes think the spreadsheet should be open all the time – as it is with those codes – but once you learn how to use the WorkSheet, you'll not want to go back. Use SPS when it makes sense, and close it afterwards.

The screenshot above shows the **SketchPad** display, which interacts with WS, and if your display does not show the same formats, just click the button on the PAD toolbar to restore the default display settings. PAD is the main graphical interface with the program, and it can display any combination of lens profile drawings, perspective drawings, paraxial drawings, ray fans, OPD fans, astigmatism curves, or spot diagrams. Explore the buttons on the PAD toolbar to learn how to manage the display.

Let's examine the performance of this lens, which of course is not very good. What does the image look like? Type **MGI** to open the Geometric Image menu, select the Multicolor option on the **SPT** section, and then click that button. Your spot diagram shows up, shown on the left below. Now just press the Enter key, and the MGI dialog opens again[1]. Click the switches button and turn off switch 27. Now click the SPT button again. The picture on the right appears. There are many mode switches that affect how the program works, and you can experiment with them to learn how to customize the program for your needs. (And you don't have to memorize all the dialog names we use in this book. Click the **EZ Menus** item in the top menu bar, and you can navigate the dialog tree.)
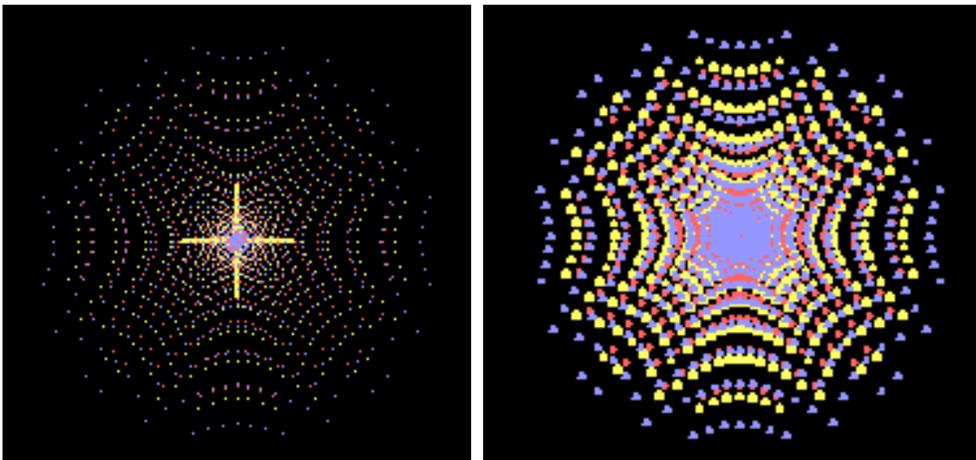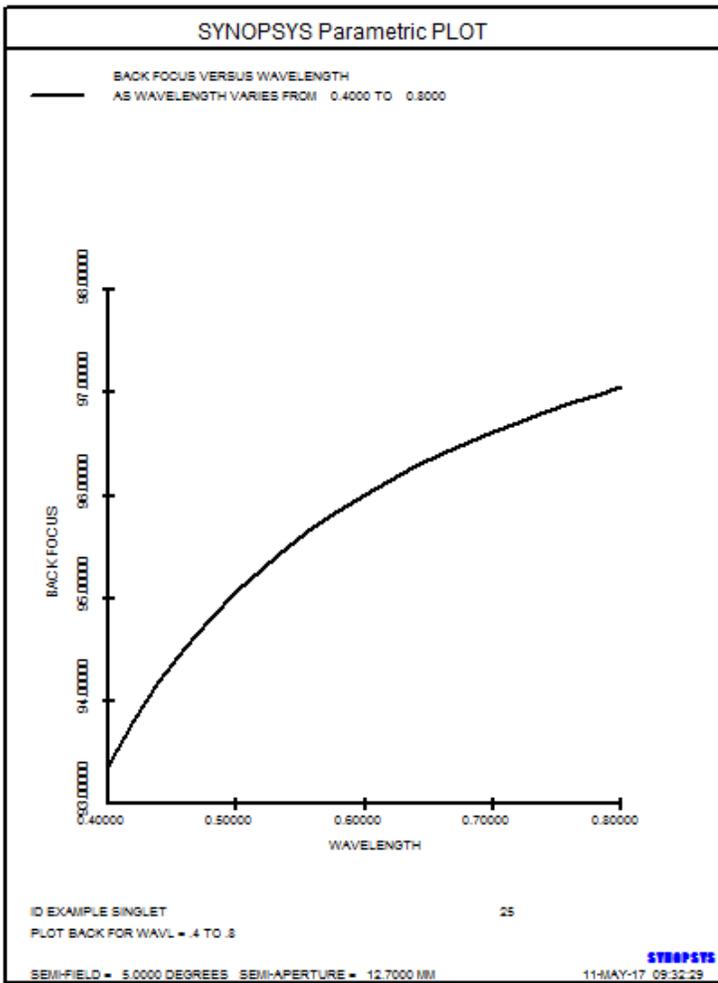

Now type, in the CW,

        PLOT BACK FOR WAVL = .4 TO .8.

This shows how the back focus changes with wavelength.   (You always have to press the Enter key after typing a command or AI sentence.)

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[1] Many of the dialogs will open again after you use them and then press the Enter key.

SYNOPSYS Parametric PLOT

BACK FOCUS VERSUS WAVELENGTH
AS WAVELENGTH VARIES FROM   0.4000 TO   0.8000

ID EXAMPLE SINGLET   25
PLOT BACK FOR WAVL = .4 TO .8

                                                        SYNOPSYS
SEMI-FIELD = 5.0000 DEGREES   SEMI-APERTURE = 12.7000 MM   11-MAY-17 09:32:29

You have just typed an English-language sentence that is understood by the **AI** or **Artificial Intelligence** feature. We will use it frequently in these lessons.