Creating Ray Files

Requirements

Models: None

Properties: None

Editions: TracePro LC, Standard or Expert

Introduction

A file containing ray data can be inserted into a TracePro model and used as a source. A ray file consists of 7 columns of tabular data, XYZ starting positions for each ray, XYZ direction vectors for each ray, and a flux value for each ray.

The File Source provides the capability to:

1. Use measured source distribution data in the form of a ray file to create a source in TracePro. Ray files can be downloaded from the website of an LED manufacturer and used in a TracePro model.
2. "Continue" a raytrace by using data incident on one surface as a source in another raytrace or model.
3. Create a source from either theoretical or measured data in another application (e.g. - text editor or spreadsheet application).

This tutorial demonstrates Option 2, saving rays incident on a surface in one model and using those rays as the source in another model.

Defining the Target Surface

Insert a cylinder at Z = 10 by selecting **Geometry|Primitive Solid|Cylinder/Cone** and using the values shown in the figure below. The surface of this disk will be used to "catch" the rays that will later be made into a ray file.
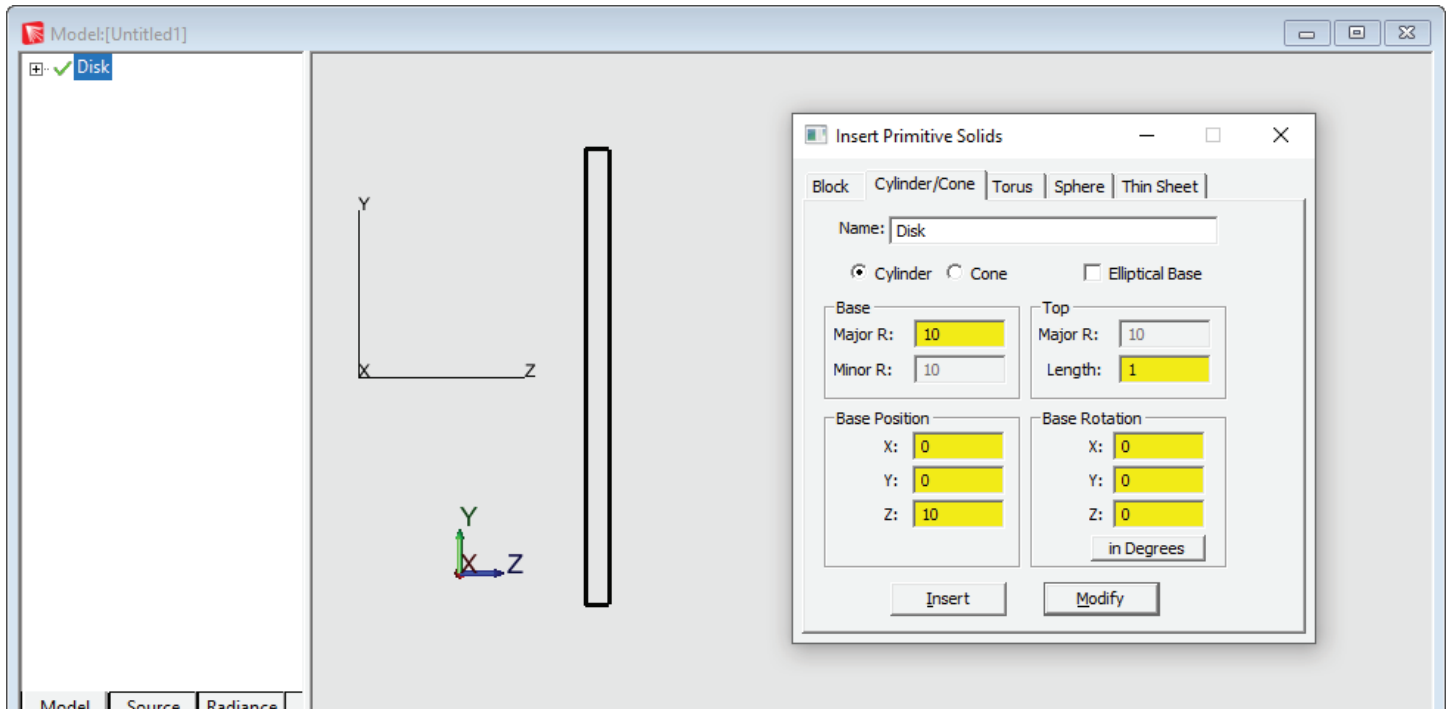
Defining the Grid Source

Switch to the system tree by clicking on the Source tab in the lower left corner of the TracePro model window. Then select **Define|Grid Source**. Next, select Grid Source 1 in the system tree to modify the source to trace the rays that will be incident on the disk. Click on the red x mark next to the Grid Source to change it to a green check mark so it will be included in the ray-trace. Enter the values shown in the figure below, in the *Grid Setup* and *Beam Setup* tabs, and click *Modify* to save the changes. Click **Raytrace|Trace Rays** to trace the rays.
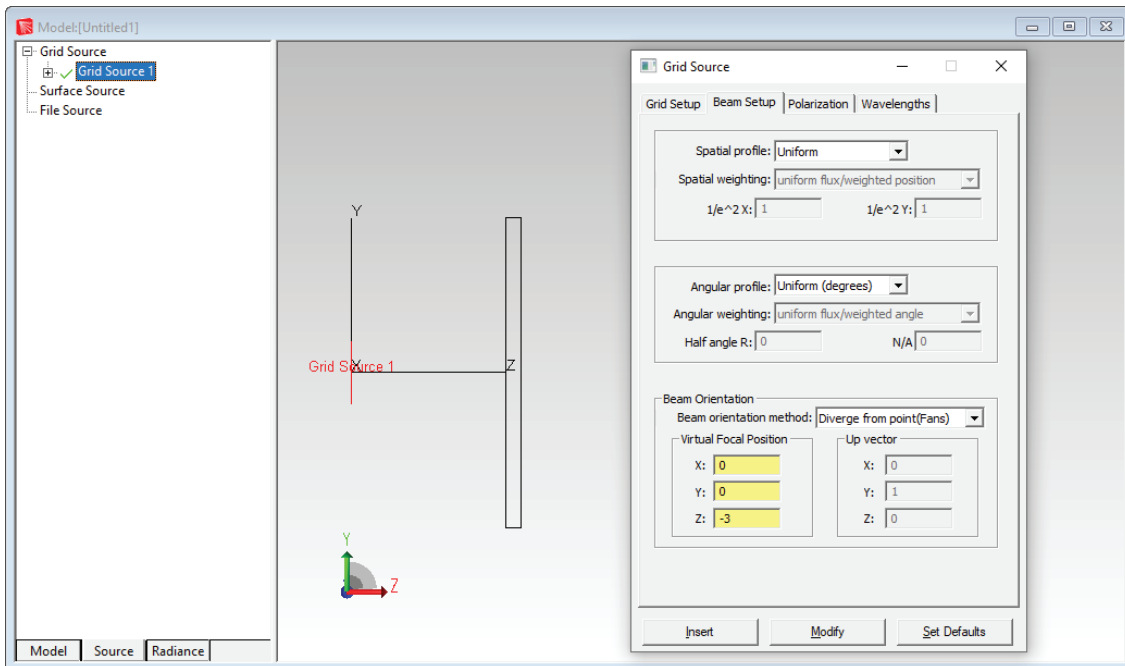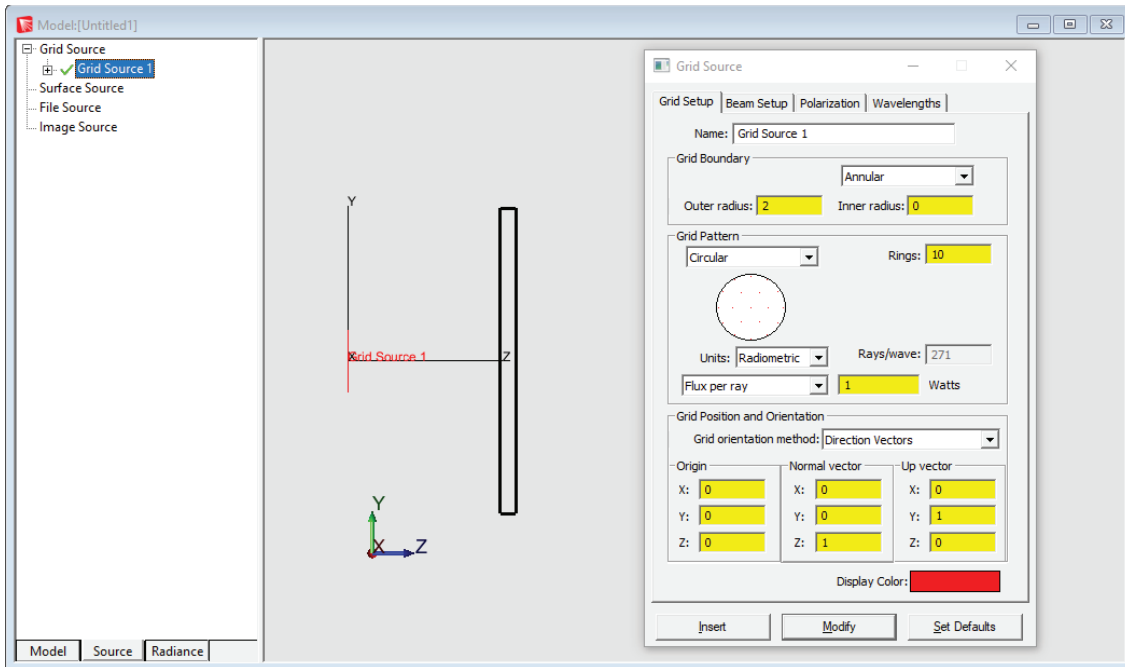
Making the Ray File

In the system tree, select the plane surface on the -z side of the Disk. This is easier to do by first selecting **View|Silhouettes**. Then select **Analysis|Incident Ray Table** to view the table of incident rays for that surface.

Ray Number	Wavelength	Source	Start Ray	Ray Node	Type	History	Flux	X Pos.	Y Pos.	Z Pos.	X Vec.	Y Vec.
1	0.5461	Grid Source 1	1	2		Emitted	1	0	0	10	0	0
2	0.5461	Grid Source 1	2	2		Emitted	1	1.02486	0	10	0.0785917	0
3	0.5461	Grid Source 1	3	2		Emitted	1	0.512431	0.887557	10	0.0392959	0.0680624
4	0.5461	Grid Source 1	4	2		Emitted	1	-0.512431	0.887557	10	-0.0392959	0.0680624
5	0.5461	Grid Source 1	5	2		Emitted	1	-1.02486	2.89637e-17	10	-0.0785917	0
6	0.5461	Grid Source 1	6	2		Emitted	1	-0.512431	-0.887557	10	-0.0392959	-0.0680624
7	0.5461	Grid Source 1	7	2		Emitted	1	0.512431	-0.887557	10	0.0392959	-0.0680624

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Saving the Ray File

With the *Incident Ray Table* as the active window, select **File|SaveAs** from the TracePro menu, check the box for Export to Ray File format, enter a file name as shown, and then save the file as a text file.
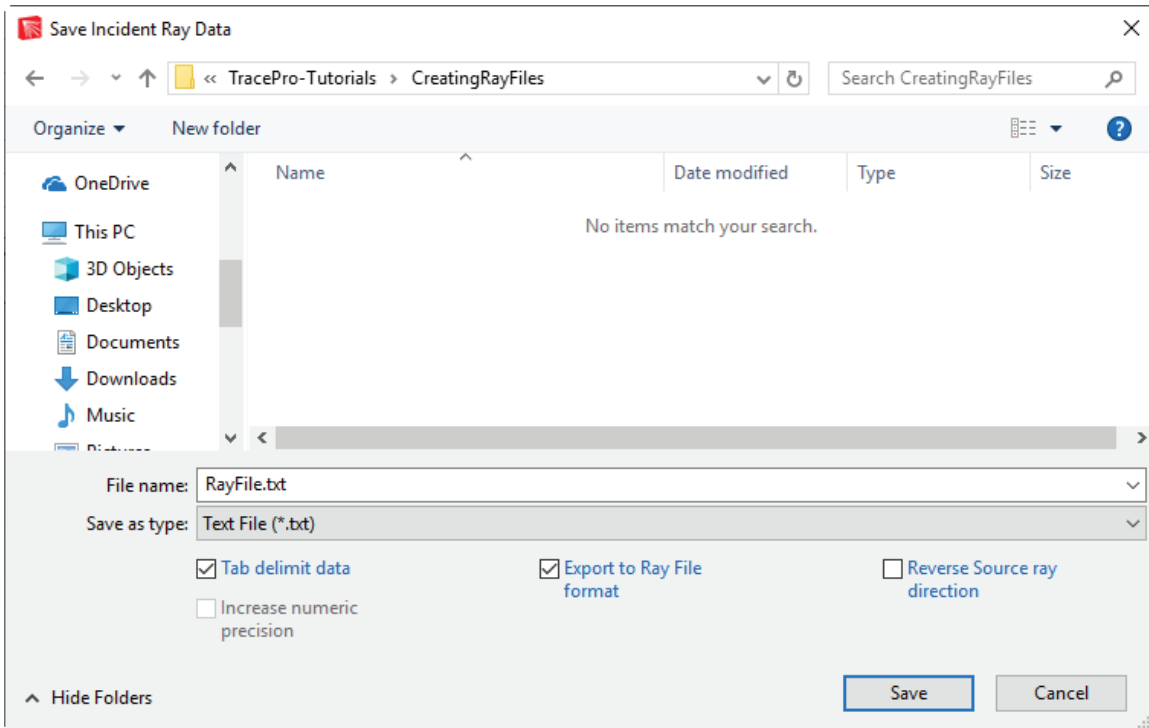
Validating and Viewing the Ray Data

Once the file is saved, you can open it and/or edit it using a text editor or a spreadsheet application. The first 7 lines are Header Information and the ray data begins on row 8, as shown below with the file opened in Notepad++.

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Making a File Source in a New Model

To use this ray file in a new TracePro model, open a new model window, then select **Define|File Source**, enter a name for the source, click the browse button [...] and locate the ray file, and then click *Insert*. If you insert the source at the origin (0, 0, 0), the rays will emit from the Z = 10 plane, which is in the same location as the collection surface (the Disk). You can think of the Center Position in the dialog as an offset to the starting position of the rays in the Source File. For example, if you wanted these rays to emit from Z = 20, then you would insert the source at (0, 0, 10). For the purpose of this example, the source is at the inserted origin.

Note that the File Source is represented by a sphere. The sphere is a best fit that surrounds the starting positions of all the rays. It has no meaning in the model other than as a visual place holder.

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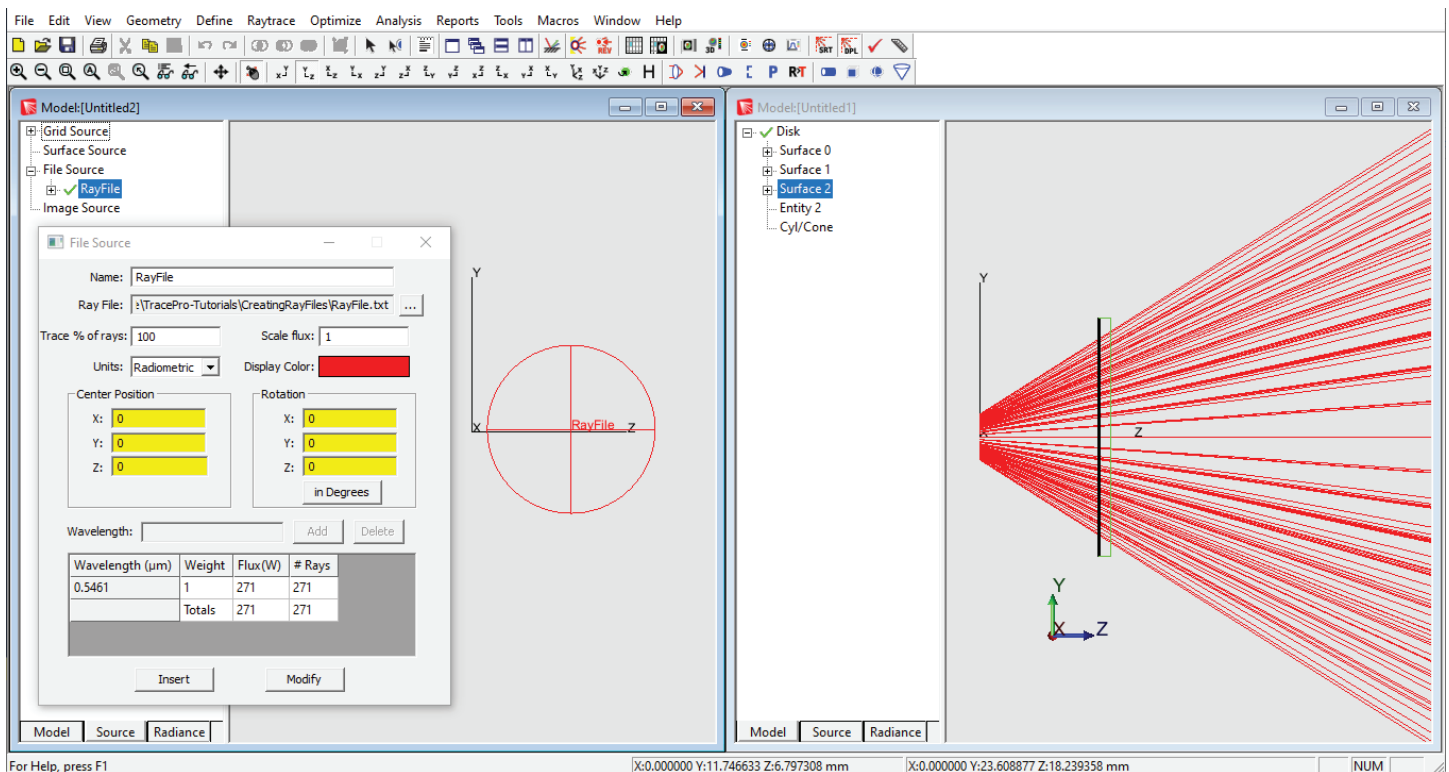
Tracing the File Source Rays in a New Model

To trace the rays from the File Source, right-click on Ray File in the source tree and then click *Trace Selection* to see the rays emit from the starting positions and directions specified in the ray file. You can ignore the warning message about no valid objects in the model.