TracePro® Tutorial

Luminance Map Example

Luminance Map Tutorial

The following example is based on a simple model constructed for the purpose of demonstrating the Luminance Map feature. The geometrical model consists of a glass ball resting on the surface of a back-and-white checkerboard. Two sides of the checkerboard (those furthest from the eye point) are backed by gray walls. A Silhouette view of the geometry of the model is shown in Figure 1, and a rendered view in Figure 2.

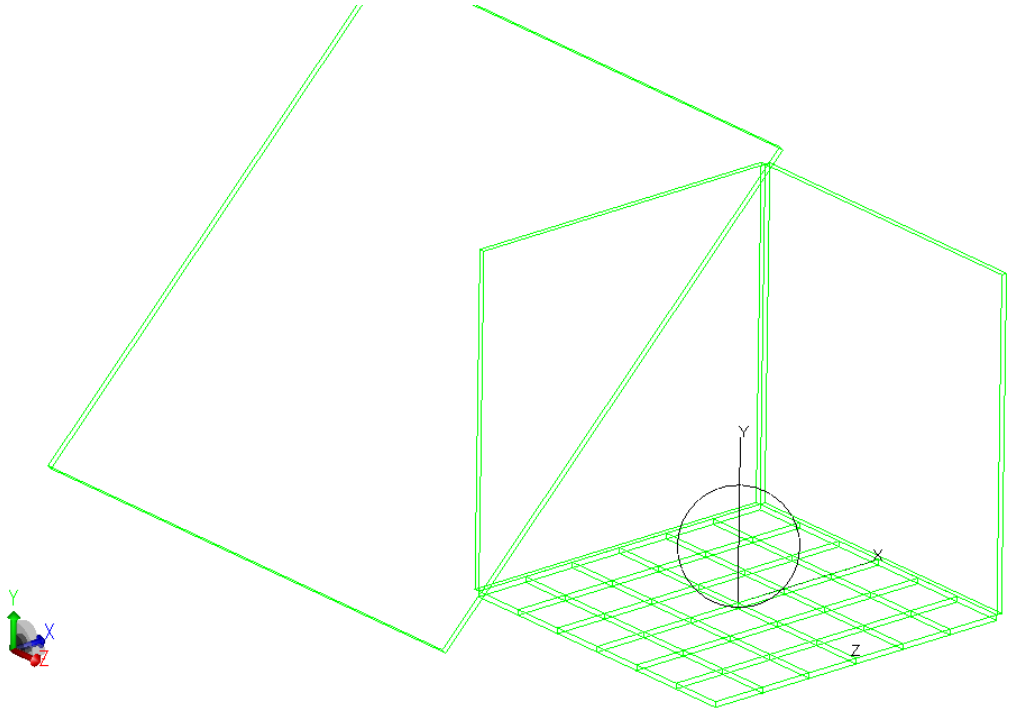

Figure 1. Silhouette view of the model "glass sphere on checkerboard.oml."

Luminance Map Tutorial

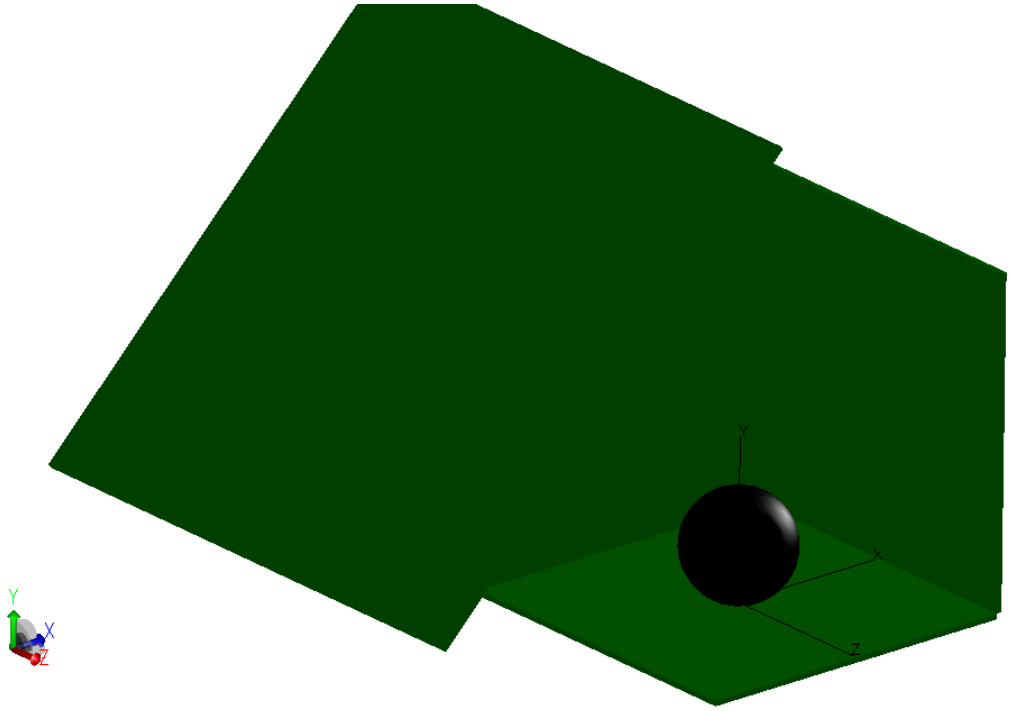

Figure 2. Rendered view of the model "glass sphere on checkerboard.oml."

The model consists of a sphere made of glass (Schott BK7) with no surface property, resting on a checkerboard consisting of alternating black and white squares. The black squares have the Default:Black Paint property (reflectance of 10%), and the white squares have Lambertian:Diffuse White property. These properties are spectrally flat. The back walls have the property Default:19% gray, which is Lambertian with reflectance 19%. The large tilted square is the lone light source in the model.

To begin, open the model "glass sphere on checkerboard.oml" and import the properties by selecting Tools/Database/Properties (alternative - F11 key) and importing the file "glass sphere on checkerboard properties.txt."

Luminance Map Tutorial

The Luminance Map data is already defined for this model. To see the data, choose the Luminance tab in the System Tree, right-click in the tree on “image”, then select Define/Luminance and see the dialog box shown in Figure 3.

The Quality is set to High in the saved file, but for the purpose of this demonstration you might prefer changing to Low to decrease the raytrace time. To make this change, select Low for the Quality, then click “Modify”.

Click on “Trace this” to trace the rays.

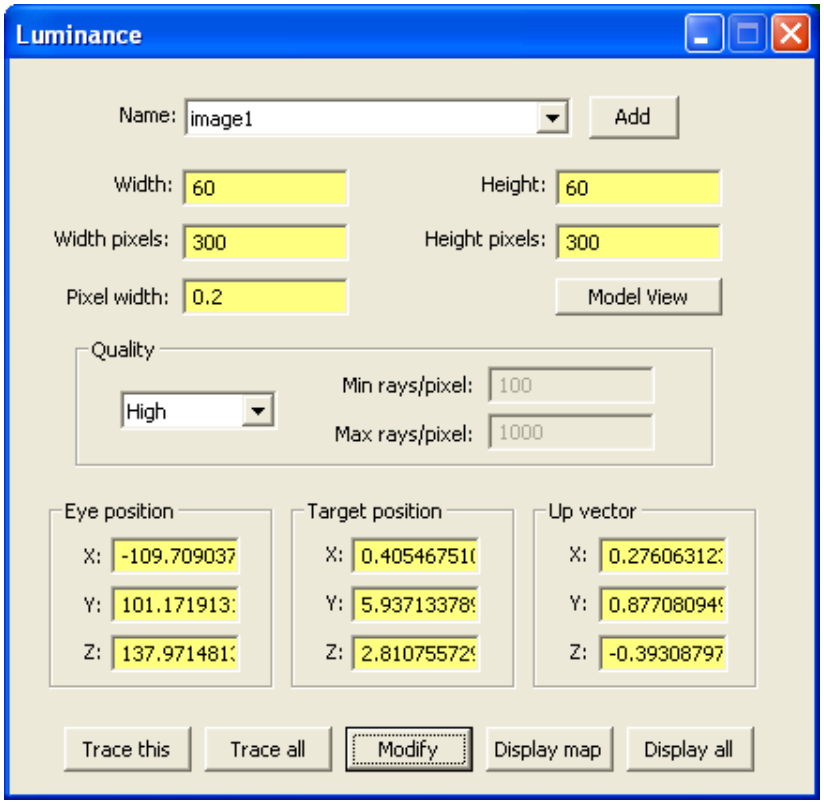

Figure 3. Luminance settings for the “glass sphere on checkerboard” example.

Luminance Map Tutorial

After the rays have been traced, click on the Display Map button to view the map. The default map option is for a Grayscale gradient. Select Analysis/Luminance-Radiance Map Options (or right-click on the map and choose “Luminance map options”) to change the color to False Color (rainbow), then click Apply.

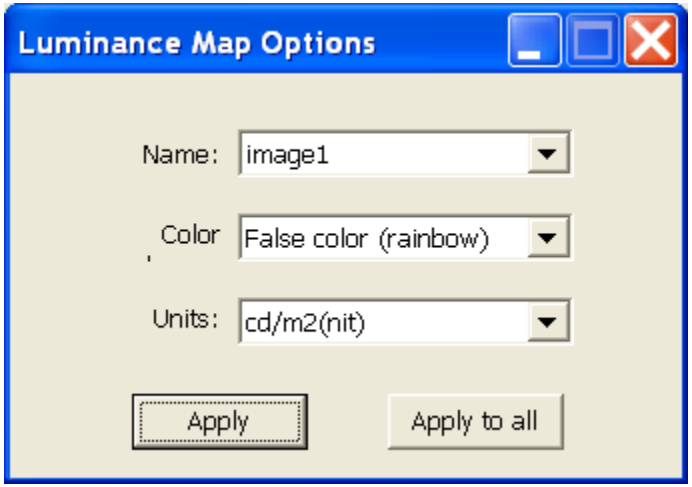

Figure 4 - Luminance Map Options dialog

The result of each of the Color Scheme selections in the Luminance Map Options dialog box is shown in Figure 5 through Figure 10 These images are the result of the High Quality Luminance calculation, your results may differ if you ran the faster, Low Quality option.

Luminance Map Tutorial

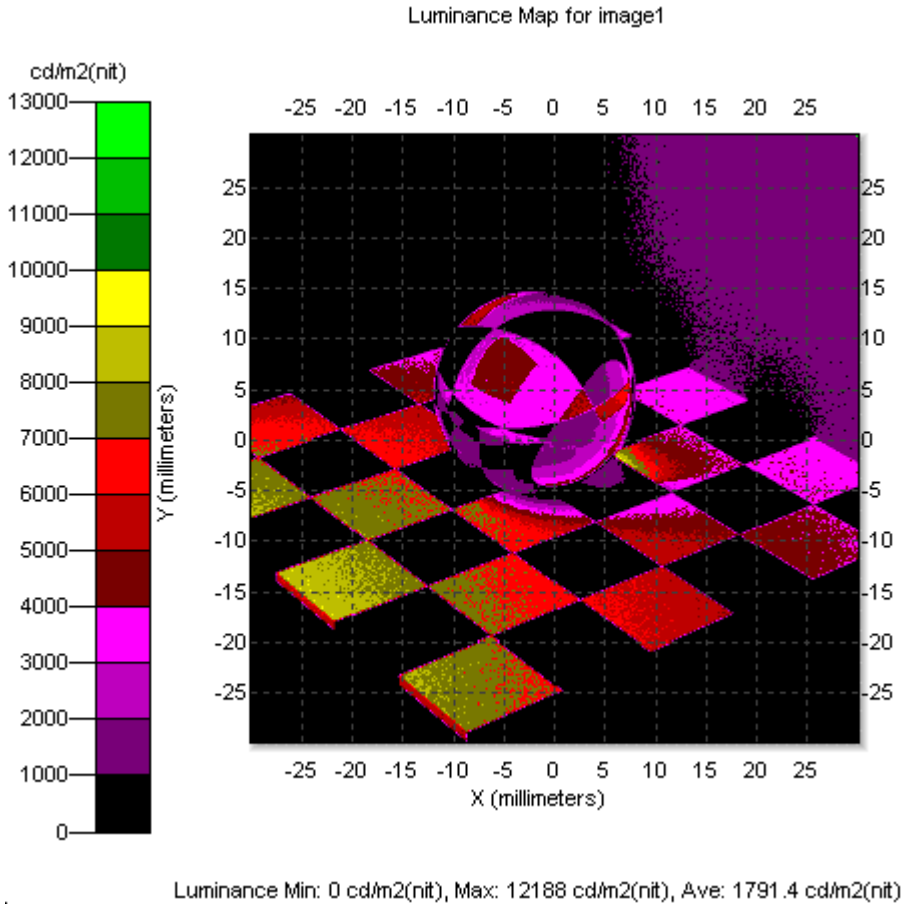

Figure 5. Luminance map for Color Scheme = False color (rainbow).

Luminance Map Tutorial

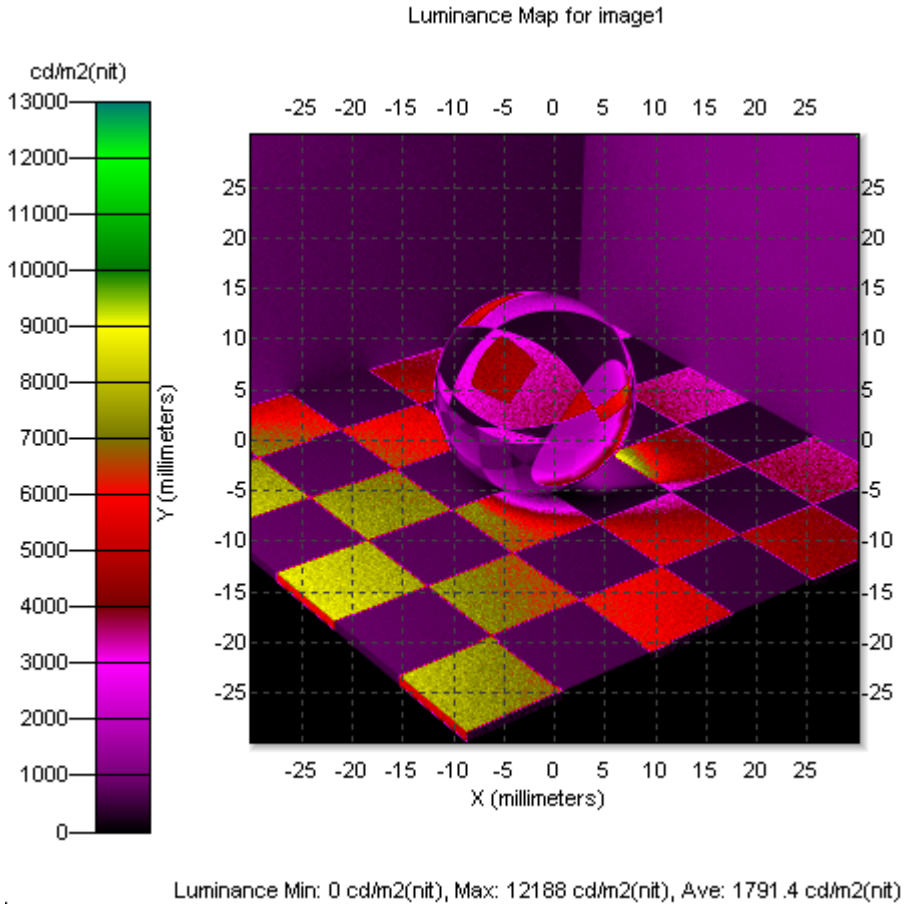

Figure 6. Luminance map for Color Scheme = False color gradient (rainbow).

Luminance Map Tutorial

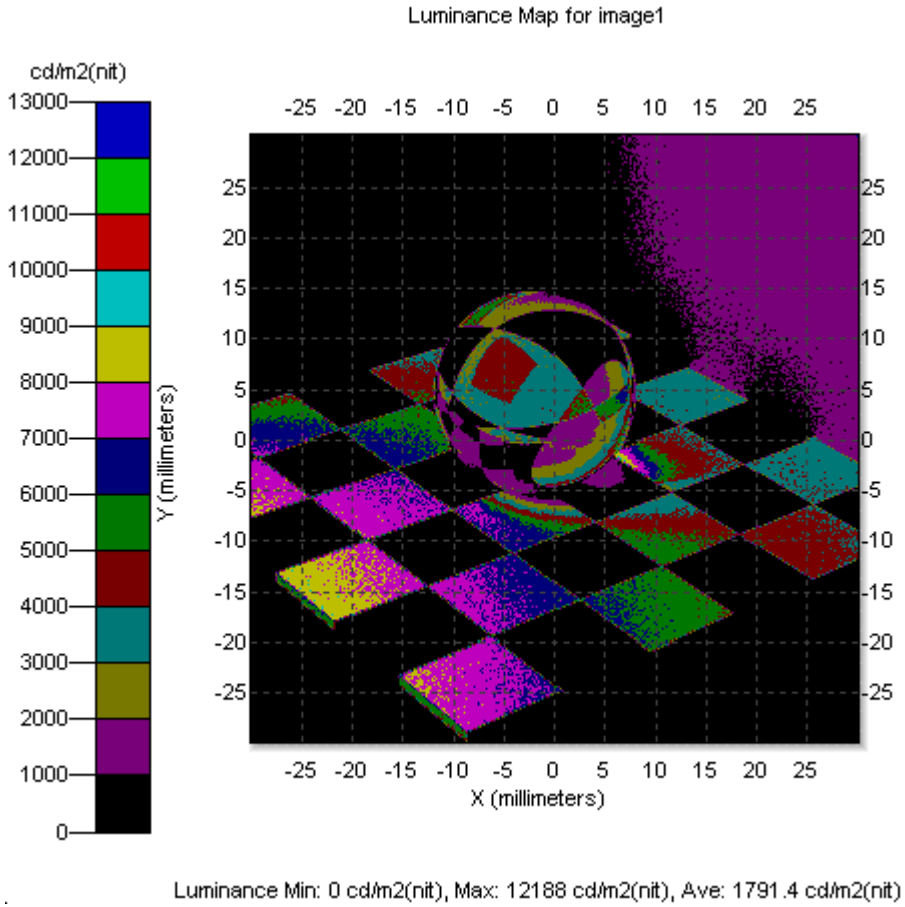

Figure 7. Luminance map for Color Scheme = False color (step).

Luminance Map Tutorial

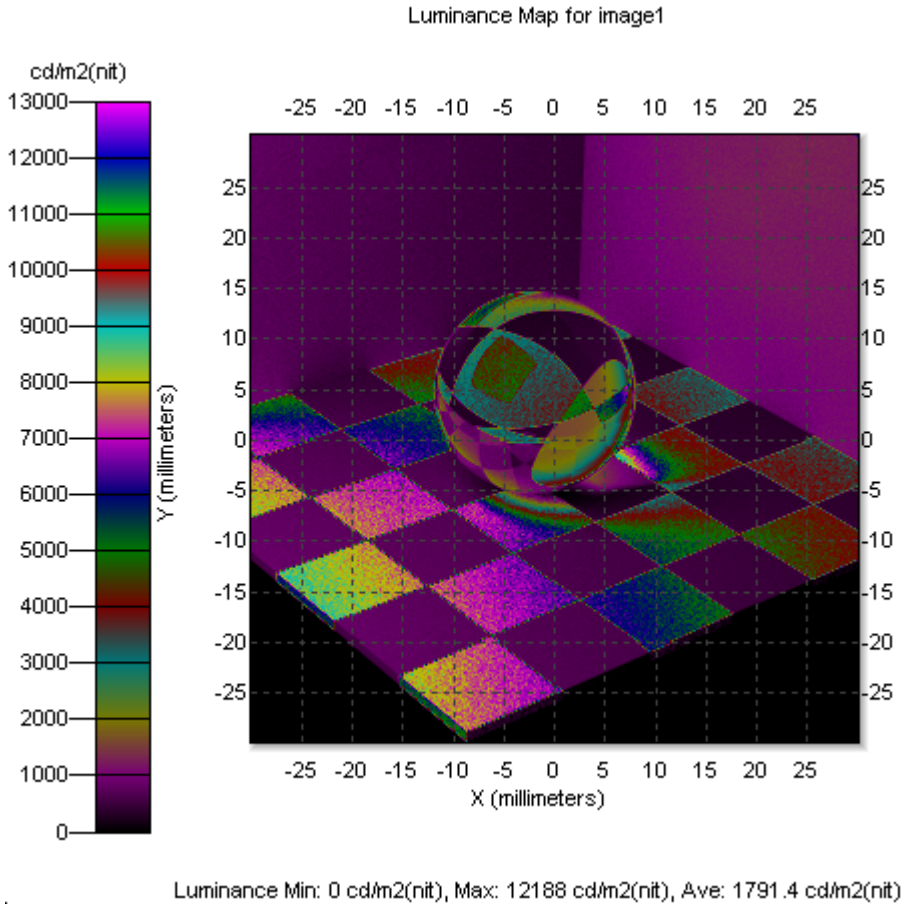

Figure 8. Luminance map for Color Scheme = False color gradient (step).

Luminance Map Tutorial

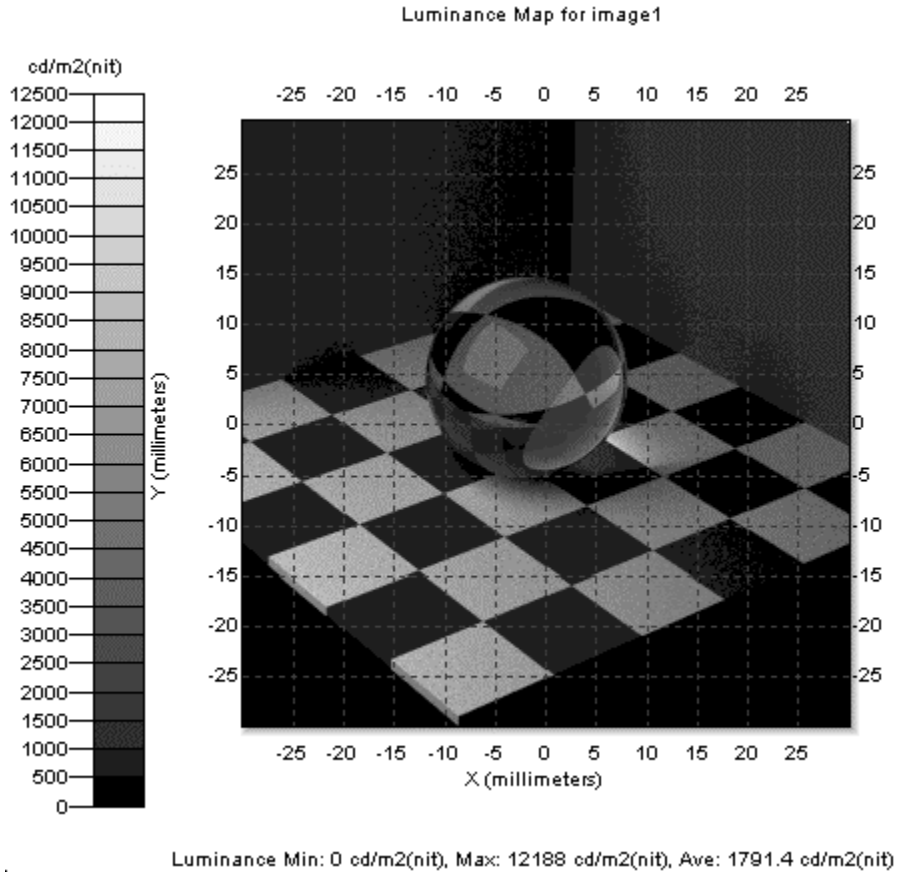

Figure 9. Luminance map for Color Scheme = Grayscale.

Luminance Map Tutorial

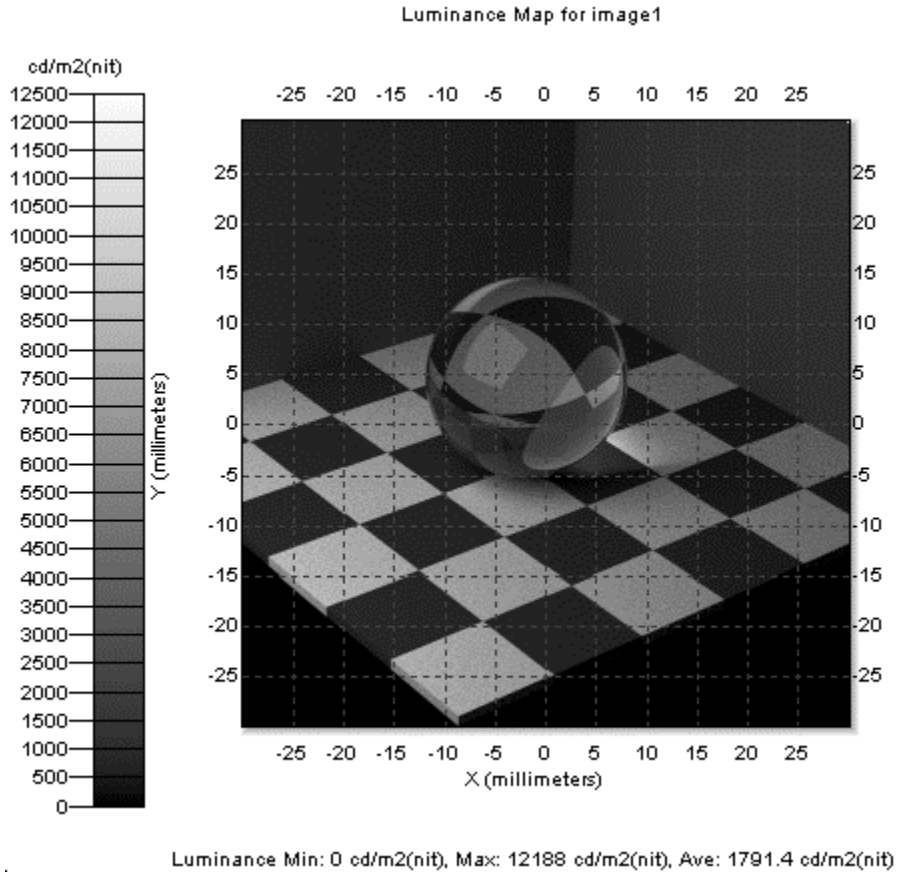

Figure 10. Luminance map for Color Scheme = Grayscale gradient.

Luminance Map Tutorial

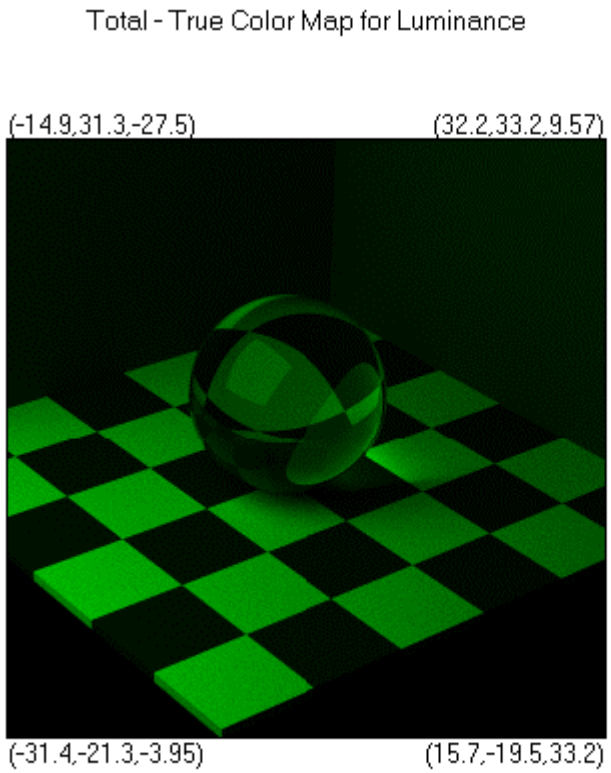

Figure 11. Luminance map for Color Scheme = True color.

This setting produces a rendered image of the geometry. One wavelength was traced for this example 0.5461 µm, which is in the green part of the visible spectrum. This accounts for the green cast in the rendering.

Luminance Map Tutorial

For an additional exercise, open the file “glass sphere on red-white checkerboard.OML”, and select Analysis/Raytrace Options to see that 3 wavelengths have been defined:

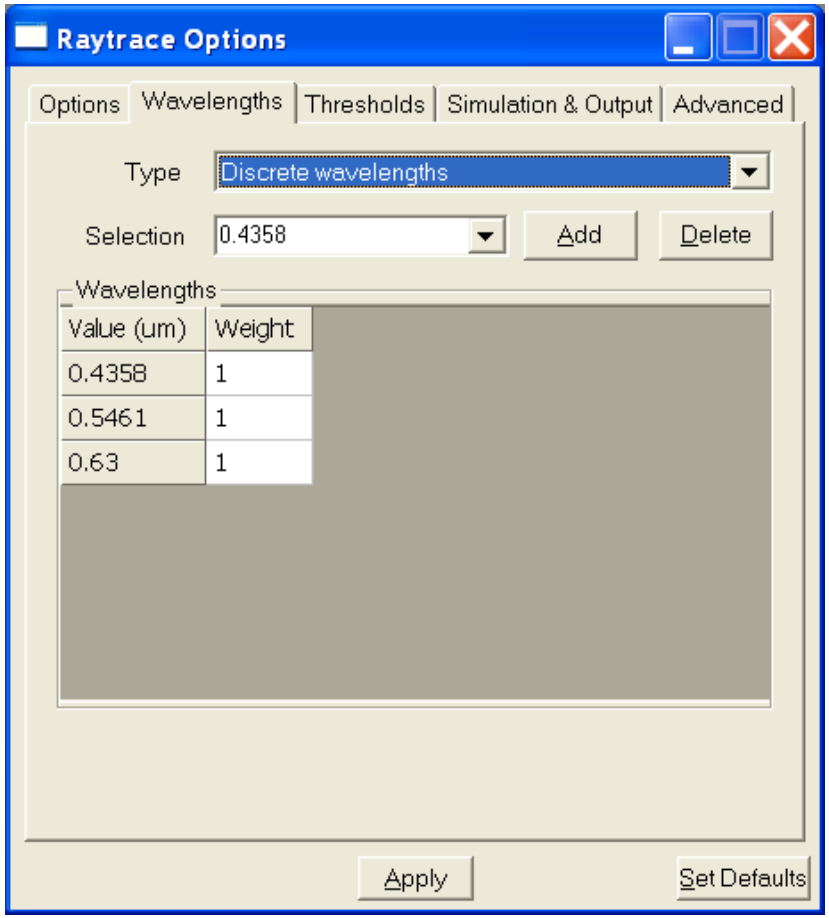

Figure 12 - Raytrace Options dialog for "glass sphere on red-white checkerboard.OML"

Luminance Map Tutorial

Import (Tools/Database/Import) the additional property file “red paint, flat1.txt”.

Choose the Luminance tab in the System Tree.

Right-click on “image” in the tree, and choose Define Luminance

Select Trace Rays in the Luminance dialog.

After the rays have traced, select Display Map to view the map.

Select Analysis/Luminance-Radiance Map Options to view the map with various options.