Subject: Re: Realistic Illumination, IDL & OpenGL
Posted by Matt Feinstein on Mon, 02 Feb 2004 19:19:23 GMT
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On 30 Jan 2004 14:06:09 -0800, nasalmon@onetel.net.uk (Neil) wrote:

> Could someone please help me with problems of illumination in IDL.
>
> For Object Graphics to emulate reality, illumination must be
> accurately represented. Take for example an outdoor scene, where sky
> background emission above and up-welling emission below bathes an
> object in different intensities from all directions. Can this be
> accurately described in IDL or OpenGL?
>
> In IDL Object Graphics there is the possibility to bring in the
> "light" by way of obj_new "IDLgrLight". However, this can only be:
> type 0) Ambient; 1) point source; 2) collimated beam; 3) spot light
> (apertured). The number of lights is limited to 8. Is this
> illumination limited by IDL or the OpenGL on which IDL operates?

For what it's worth: Each light in the OpenGL lighting model has three components; specular, diffuse and ambient, . Specular obeys a parameterized variant of the 'angle of reflection equals angle of incidence' model, diffuse obeys a lambertian model, and ambient is, well, ambient. The lights can be in any position, including infinity, and they may have any angular width. The illumination from any given source is a sum of these three models. The OpenGL spec allows a lighting model of up to eight independent light sources. There is also a 'true' ambient illumination that isn't tied to a light source.

This is combined with a general coloring model-- the color of every facet is a combination of four components; specular, diffuse, ambient, and emissive. The observed color of any component due to a given source is the product of the color of that component of the source and the color of that component of the material.

So, there are -lots- of parameters. In fact, considering that every facet may have a different color and a different normal vector (the normal vector is used in the specular lighting model), a rendered scene could easily have many thousands of parameters. The difficulty in modeling lighting is not a lack of parameters.

And, I've neglected to mention shadowing, which is a whole other problem-- you have to figure out a way to compute shadows (non-trivial) and -then- combine the shadows with your existing lighting model.

Matt Feinstein

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There is no virtue in believing something that can be proved to be true.