Graphics Notes

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Phong Reflection Model

A commonly used model used for modelling reflectance is the Pong model (eqation ~(1)) [1]. We refer to this model for its compromise in simplicity and realism, but most importantly for the ease and efficiency of implementation on a digital computer using hardware accellated graphics. The Phong model provides the reflection intensity I_p as a function of the cofficients for the reflection properties of the material (α_s specular, α_d diffuse, α_a ambient, and α_0 shininess), lighing properties (i_s specular, i_d diffuse, and i_a ambient), the vector direction of the light source, $\hat{l}$, vector direction of the surface to observer, $\hat{v}$, and the surface normal, $\hat{n}$, from k lighting sources.

$$I_p = k_a i_a + \sum_{k \in sources} \left[\alpha_d \left(\hat{l_k} \cdot \hat{n} \right) i_{k,d} + \alpha_s \left(\left(2 \left(\hat{l_k} \cdot \hat{n} \right) \hat{n} - \hat{l} \right)^{\alpha_0} i_{k,s} \right) \right] \tag{1}$$

References

[1] Wikipedia, "Phong reflection model — Wikipedia, the free encyclopedia," 2011, [Online; accessed 16-July-2013]. [Online]. Available: http://en.wikipedia.org/Phong_reflection_model