Solution - Exercise [6]

Introduction to Computer Graphics - B-IT Master Course

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First Exercise

$L_{ambient} = L_a \cdot k_a$, where
L_a - Intensity of ambient light
k_a - ambient reflection constant, the ratio of reflection of the ambient term present in all points in the scene rendered
$L_{ambient}$ component does not depend on the angle of incidence of the light beam and the view angle of the observer. Ambient light source represents a fixed intensity and fixed color light that affects all objects in the scene equally.

Second Exercise

$L_{diff} = L_d \cdot r_d \cdot (\mathbf{N} \cdot \mathbf{L})$
$L_{spec} = L_s \cdot r_s \cdot (\mathbf{E} \cdot \mathbf{R})^m$
N - normal on the surface at the point where the light touches the surface
E - the vector in the direction of the viewer
L - the direction vector from the point on the surface towards the light source
R - the vector of a perfectly reflected ray of light (L)
m - shininess coefficient of the material (the more the surface is mirror-like, the more the coefficient is)
r_d - diffuse reflection constant - the ratio of the reflection of the diffuse term of incoming light
r_s -specular reflection constant specific to the surface - the ratio of the reflection of the specular term of incoming light
L_d - intensity of diffuse term of the light
L_s - intensity of specular term of the light

L_d and L_s are intensities that are often defined as RGB values. In physics light intensity is measured in Watt per meter squared.