directional light intensity

ambient light intensity

rendered value

$$u_k = m_k(d_k \max(\cos\theta, 0) + a_k)$$

reflectance (albedo)

angle between lighting direction and surface normal sRGB nonlinearity

directional light
intensity

ambient light
intensity

rendered value

$$u_k = \frac{c\, s(m_k)(d_k \max(\cos\theta, 0) + a_k)}{2^e}$$

reflectance
(albedo)

angle between
lighting direction
and surface normal

constant

exposure

sRGB nonlinearity

rendered value

$$u_k = s(m_k)$$

reflectance
(albedo)

inverse of
sRGB nonlinearity

post-processed value

rendered value

$$v_k = s^{-1}(t(u_k))$$

tonemapping
function

displayed luminance

post-processed value

$$L = h(v_k)$$

transfer function of headset

The goal of gamma correction is to make the displayed luminance proportional to the rendered value u_k.

$$L = h(s^{-1}(t(u_k)))$$

$$L_{max} = h(1)$$

$$h^*(x) = h(x)/L_{max}$$

$$L = L_{max}\, h^*(s^{-1}(t(u_k)))$$

The goal of gamma correction is to make the displayed luminance proportional to the rendered value u_k.

$$L = L_{max}\, h^*(s^{-1}(t(u_k)))$$

$$t(u_k) = s(h^{*-1}(u_k))$$

$$L = L_{max}\, u_k$$

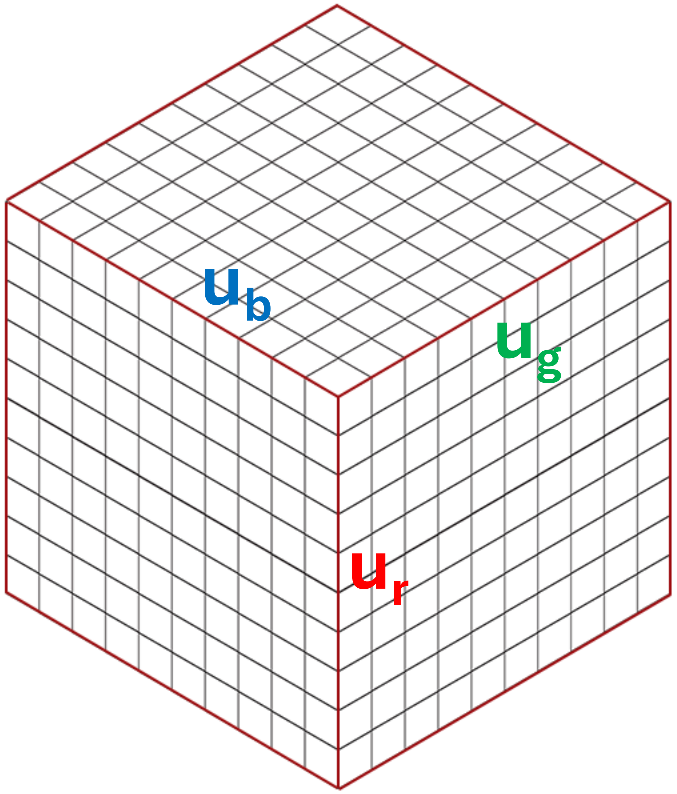
We can set the post-processed value v_k using the unlit material.

$$u_k = s(m_k)$$

$$v_k = s^{-1}(t(u_k))$$

$$v_k = s^{-1}(s(m_k)) = m_k$$

tonemapping is specified via a cube of knot points in a .cube file



$$v_k = s^{-1}(t(u_k))$$

```
TITLE "linearize.cube"
LUT_3D_SIZE 32
DOMAIN_MIN 0.0 0.0 0.0
DOMAIN_MAX 1.0 1.0 1.0
0.000000 0.000000 0.000000
0.000000 0.000000 0.000000
0.000000 0.000000 0.000000
0.002028 0.000000 0.000000
0.006580 0.000000 0.000000
0.009645 0.000000 0.000000
0.016084 0.000000 0.000000
0.024487 0.000000 0.000000
0.034994 0.000000 0.000000
0.050486 0.000000 0.000000
0.071000 0.000000 0.000000
0.100853 0.000000 0.000000
0.140785 0.000000 0.000000
0.198981 0.000000 0.000000
0.281838 0.000000 0.000000
0.395382 0.000000 0.000000
0.561895 0.000000 0.000000
0.785285 0.000000 0.000000
1.121953 0.000000 0.000000
1.000000 0.000000 0.000000
1.000000 0.000000 0.000000
1.000000 0.000000 0.000000
1.000000 0.000000 0.000000
1.000000 0.000000 0.000000
1.000000 0.000000 0.000000
1.000000 0.000000 0.000000
1.000000 0.000000 0.000000
1.000000 0.000000 0.000000
1.000000 0.000000 0.000000
1.000000 0.000000 0.000000
1.000000 0.000000 0.000000
```