EXERCISE 5 – CHRISTMAS EDITION

1. Illumination

When implementing Phong illumination something strange might happen, when you polish a metrial.

(a) Which three components make up the Phong illumination model? How are they combined in order to compute the overall illumination?

(b) Write down the equation for the component that is required for creating highlights. Explain the individual variables.

(c) Which variable is changed in what way, when you polish the material?

(d) Compute the result for highlights using the following settings (assuming monochromatic light).

$I_p = k_a = 1$,

$\mathbf{r} = \frac{1}{\sqrt{2}} \begin{bmatrix} 1 & 1 \end{bmatrix}^\top$,

$\mathbf{v} = \frac{1}{\sqrt{5}} \begin{bmatrix} -2, 1 \end{bmatrix}^\top$,

$n = 2, 3, 4, 5$.

Comment on how these results affect the overall illumination.

(e) What went wrong in the implementation? How to avoid it?