

CS667 Homework 3

(due 25 September)

Starting from your microfacet model implementation from Homework 2 (or from a friend's code, or from my MATLAB implementation available in CMS), write code to compute the directional-hemispherical reflectance of the BRDF. Set it up so that you can use uniform sampling or sampling according to D as recommended by Walter et al. [1].

1. Compute and plot the directional-hemispherical reflectance for $\alpha_b = 0.1$ and $n = 1.5$ at 5 degree increments. Use enough samples to get a reasonably smooth plot with microfacet sampling.
2. For 45 degrees incidence, plot the variance of your estimate as a function of N , the number of samples, for each of the two sampling distributions. Does it decrease as the inverse square root of N ?
3. Repeat parts 1 and 2 for $\alpha_b = 0.01$. Discuss any differences in results.

Reference

- [1] Bruce Walter, Stephen R. Marschner, Hongsong Li, and Kenneth E. Torrance. "Microfacet Models for Refraction through Rough Surfaces." In proceedings of *Eurographics Symposium on Rendering 2007*.