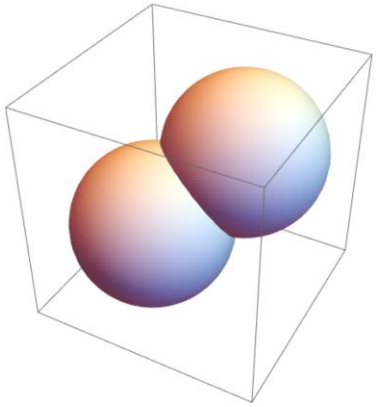
CS 419: Production Rendering Fall 2018
In-class Worksheet 6

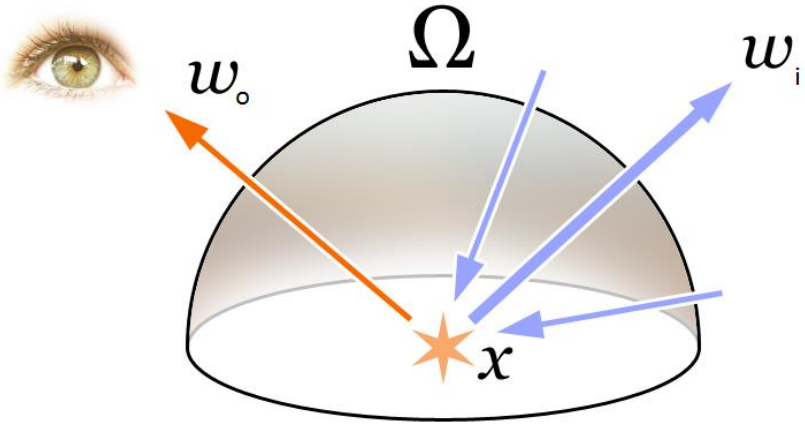
Monte Carlo Methods

1. We want to calculate the volume of intersection between two spheres of radius 1. Sphere S1 is centered at (1,1,0) and S2 is at (1,2,0). Describe how you could use a Monte Carlo method to compute this volume.



2. Suppose we generate an insufficiently converged approximation to an integral using a Monte Carlo method and N samples. If we wish to reduce the error by 1/3 with high probability, how many samples are needed?

Rendering Equation



The hemisphere form of the rendering equation was developed by James Kajiya in1986. Describe, as best you can, what each of the components below represents:

$$L_o(p,w_o) = L_e(p,w_o) + \int_{2p^+} f_r(p,w_i,w_o) L_i(p,w_i) \cos q_i \, dw_i$$