

**CS 667 Problem 1.**

1. What is the irradiance caused by a disc-shaped light source of radius  $R$  and radiance  $L$  on a surface facing the source at distance  $r$  from the center of the source? (The surface normals of the source and receiver point directly at one another.)
2. What is the irradiance caused by a spherical light source of radius  $R$  and radiance  $L$  on a surface facing the source at distance  $r$  from the center of the source?
3. If we approximate each of these sources by a point source, how far away does the surface have to be for the approximation error to be less than 1%?