

## Practice questions - photometric stereo

April 17, 2018

1. In photometric stereo, we assumed that all images were taken from the same viewpoint/camera. Why is this assumption necessary?
2. Consider a hypothetical material with a BRDF given by  $\rho(\theta_i, \theta_r) = \frac{1}{\cos \theta_i}$ , where  $\theta_i$  is the angle made by the light direction with the surface normal, and  $\theta_r$  is the angle made by the viewing direction with the surface normal.
  - (a) Will the appearance of this surface vary with the viewing direction?
  - (b) Will it vary with the incoming light direction?
  - (c) Will we be able to use photometric stereo to reconstruct an object made of this material?
3. In class, we derived how we can use the estimated normals to get some constraints on depth.
  - (a) Are these constraints linear in depth?
  - (b) In class we derived these for the case of scaled orthographic projection. Rederive these equations for standard perspective projection.
  - (c) Are the equations still linear?