

Lab Assignment 1

Steps to be followed:

1. Take a known surface $z = f(x, y)$. It can be a sphere $z = z_0 - \sqrt{(r^2 - x^2 - y^2)}$. Compute the partial derivatives p and q .
2. Assume a point light source \hat{s} given at location $(0, 0, 1)$.
3. Compute the image observation $E(x, y) = \hat{n} \cdot \hat{s}$ and save the initial conditions. Assume lambertian surface.
4. Given E and \hat{s} , compute p and q map.
5. Given computed p and q map, generate the surface $\hat{z}(x, y)$.
6. Repeat 1 to 5 for various conditions.
7. Now add noise $E_n = E + noise(\sigma)$ and see how reconstruction changes.
8. Add error in \hat{s} and see how reconstruction changes.

$$\hat{s} = s_0 + \delta\sigma$$

9. Change the smoothness parameter λ and observe the effect.
10. Now instead of (p, q) , use (f, g) and repeat steps 7-9. Compare the results.