Notes diffable Monte carlo RT

Raytracing formula

- geometry term discussed later
- Emission + All light reflected towards point
- Yields infinite recursion -> not calculable

Visualization

- Explain image
- No indirect lighting!
- Output image is what we would expect (explain shade)

Differentiable rendering

- That function is dependent on renderer
- Renderer needs to be differentiable

Importance

- Inversely render complex indoor scenes
- "Fool" neural network
- Real time realistic shading in AR
- Application in maritime research

Adversarial image generation

- Example for classification on slide 2!
- Fool neural netweork into wrongly classifying input data
    - Optimize Image into wrong class

Why differentiable rendering is hard

- Example later
- geometry term explanation later

Former methods visualization

- Plane lit by a point light source.
- gradient with respect to the plane moving right
- light source remains static => the gradient should only be $\neq 0$ at the boundaries
- OpenDR and Neural not able to correctly calculate the gradients
    - they are based on color buffer differences

Edge sampling

- Approximate point lights using small area lights
- Specular => angle of incidence = angle of light reflected
- only lambertian materials

Inverse Rendering - Results in this paper

- ADAM: talk by Mr. Wu