

Lecture 9 More Shading

May 29th, 2017

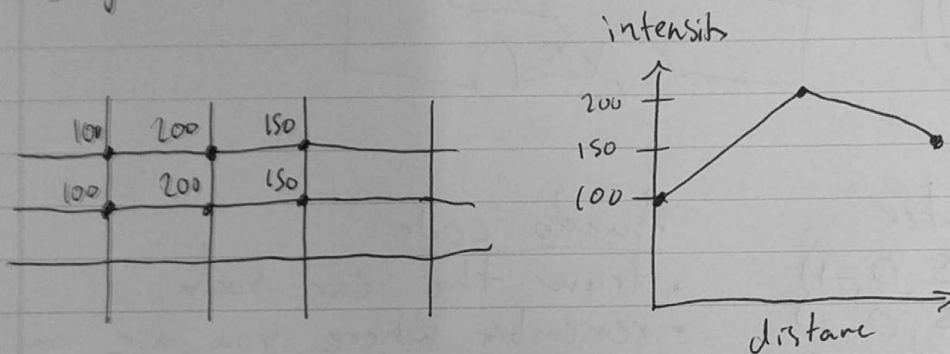
Digression

Ernst Mach, Mach Number and the study of shock waves.

Mach number $= v/a$, where
 v \equiv velocity of the source relative to the medium
 a \equiv speed of sound in the medium

Mach Band Effect

Exaggerates contrast between edges by triggering edge detection in the human visual system.



- to solve this problem we use 3 points to interpolate the color. Bicubic interpolation.

Hilroy

Phong Shading

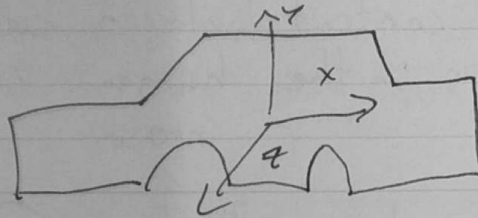
Interpolating the normal



Phong Shading \neq phong model

- Phong Shading is last thing on midterm.
- in sections ~~1314~~ 1314 (hierarchical modeling) code is wrong.

Instances & Instantiation & Instancing



Hub center:

LF(-1.5, 0, -1)
RF(-1.5, 0, 1)
LB(1.5, 0, -1)
RB(1.5, 0, 1)

- using one object to draw multiple instances.

Pseudo code:

- draw the car body
- remember where you are and translate to the right-front wheel
- draw the wheel, throw away the last translation, go back to where you were
- remember where you are and translate to the left-front wheel



- manipulate a stack to do instantiation.

QED \rightarrow the strange theory of light and Matter interactions Rf. Feynman.

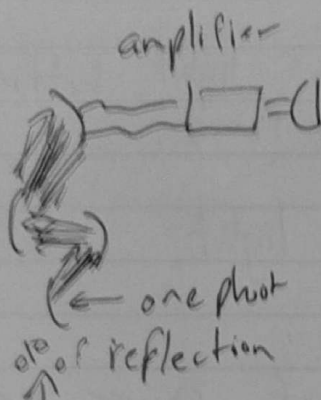
Light

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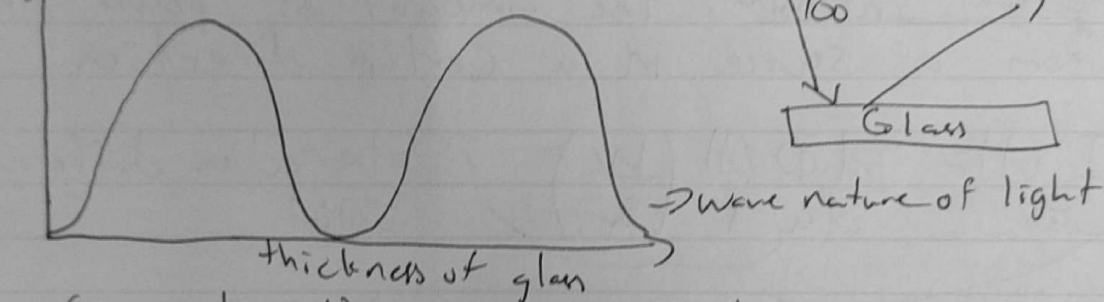
QED



- #1: Electron goes from one place to another
- #2: Photon goes " " " "
- #3: An electron can absorb or emit a photon



Sending more photons causes more clicks at the amplifier due to the particle nature of light



→ wave nature of light

- ⊗ Ray (Geometrical) optics → particle nature of light
- Wave optics → wave nature of light.
- use wavelength from wave, otherwise ignore.

↳ above is not on exams.

Hilroy

Basic Radiometric Quantities

What is the difference between energy, power (flux) and intensity?

Energy: How Much? Power: what rate?

Intensity: what rate in what direction?

Definitions:

Spectral Radiant Power (Φ): the amount of light hitting a surface during a set period of time.

$$\Phi(\lambda) = \frac{dQ(\lambda)}{dt} \quad \lambda = \text{wavelength of light}$$

Spectral Radiant Intensity: the amount of power travelling from a source in a certain direction

$$I(\lambda) = \frac{d\Phi(\lambda)}{d\omega} \left(\frac{W}{Sr} \right) \quad \omega = \text{Steradian differential solid}$$