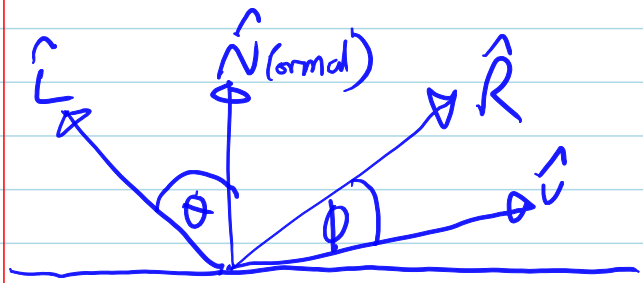
# Week 4B: rendering (2)

- each slinky: a MESH of Δ's
  - Just keep distorting the mesh yknow

- ambient = $k_a I_a$

  distance(diffuse) = $\frac{I_p}{d^2} k_d (\hat{N} + \hat{L})$

  $d^2$ = ? FML!

- 


  wavelength

  $I_{specular} = S(\phi, \theta, \lambda)$

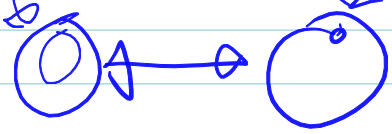
  $\cos\phi = \hat{R} \cdot \hat{V}$

- reduction of specular reflection: $F(\phi) = \cos^n \phi$?
  - phong's specular function

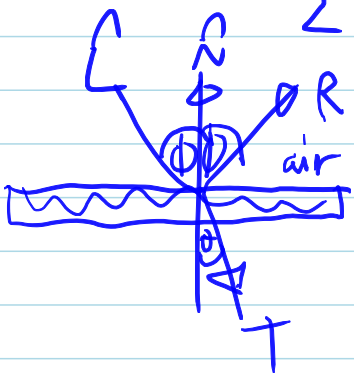
  $I_{specular} = I_p \cdot \cos^n \phi$

  OR, $I_{specular} = I_p (\hat{R} \cdot \hat{V})^n$

  more dull ← $1 \le n \le 200$ → more shiny

- Fresnel equation: $F = \frac{1}{2}\left[\frac{\sin^2(\phi-\theta)}{\sin^2(\phi+\theta)} + \frac{\tan^2(\phi-\theta)}{\tan^2(\phi+\theta)}\right]$


  → replaced with $k_s$.

  $0 \le k_s \le 1$

  We decide this value

- $I$ (spectral light INTENSITY)
  - $I_{spec}$ = ambient + distance(diffuse + specular)
- COLOURS: rgb
  - $I = ambient + \sum_{i=1}^{M} (diffuse_i + specular_i)$
    - for M lights
  - Nature: ONLY have the SUN as a natural light source.
    - ☹ Don't need multiple light sources

- (Flat v Gouard v Phong) shading
  - constant intensity normal-vector

worst ↓ best

- Flat: compute colour uniformly for each triangle in mesh
  - mach band effect
    - creates ridges — not good
- Intensity: approximation of surface normals by averaging vertex normals
- Phong: don't interpolate colours (like intensity), interpolate vectors

! Gouraud SOMETIMES includes spec. highlights but can DISTORT them, unlike Phong