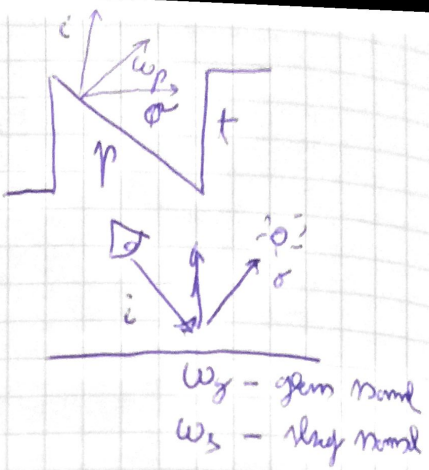
$f_2(\omega_i, \omega_o) \langle \omega_o, \omega_g \rangle =$



① $i \to p \Rightarrow o$ (single scatter)

$\lambda_p(\omega_i) f_p(\omega_i, \omega_o, \omega_p) \langle \omega_o, \omega_p \rangle G_1(\omega_o, \omega_p)$

(1.1.) $\lambda_p(\omega_i) = \dfrac{a_p(\omega_i)}{a_p(\omega_i) + a_t(\omega_i)}$ ← $a_p(\omega_i)$: PROJECTED AREA OF ω_p FACET ONTO ω_i DIRECTION; $a_t(\omega_i)$: PROJECTED AREA OF ω_t FACET ONTO ω_i DIRECTION

PROB. THAT RAYS FROM ω_i INTERSECTS ω_p

$$= \frac{\frac{\langle \omega_i, \omega_p \rangle}{\langle \omega_p, \omega_g \rangle}}{\frac{\langle \omega_i, \omega_p \rangle}{\langle \omega_p, \omega_g \rangle} + \frac{\langle \omega_i, \omega_t \rangle \sqrt{1 - \langle \omega_p, \omega_g \rangle^2}}{\langle \omega_p, \omega_g \rangle}}$$

$$= \frac{\frac{\langle \omega_i, \omega_p \rangle}{\langle \omega_p, \omega_g \rangle}}{\frac{\langle \omega_i, \omega_p \rangle + \langle \omega_i, \omega_t \rangle \sqrt{1 - \langle \omega_p, \omega_g \rangle^2}}{\langle \omega_p, \omega_g \rangle}}$$

BSDF Sample Record (MITSUBA) ↑ ↗ local-sample (APPLESEED)

ω_i

ω_p - shading normal

ω_t - tangent

ω_g - geometric

$$= \frac{\langle \omega_i, \omega_p \rangle}{\langle \omega_i, \omega_p \rangle + \langle \omega_i, \omega_t \rangle \sqrt{1 - \langle \omega_p, \omega_g \rangle^2}}$$

$\langle \omega_i, \omega_p \rangle$ → i_dot_p

$\sqrt{1 - \langle \omega_p, \omega_g \rangle^2}$ → i_dot_t

$\sqrt{1 - \cos^2\theta} = \sqrt{\sin^2\theta} = \sin\theta = \theta = \chi(\omega_p, \omega_g)$

MITSUBA IMPL OF $\lambda_p(\omega_i)$

```
float lambda(Vector wp, Vector wi)
    float i_dot_p = dot(wp, wi)
```

~~[illegible]~~

(MITSUBA) core/frame.h
Frame::sinTheta(Vector v)
Sin of angle between N and v

```
    float i_dot_t = dot(Vector(-wp.x, -wp.y, 0.0), wi)
    float sinTheta = Frame::sinTheta(wp)
    return i_dot_p / (i_dot_p + i_dot_t * sinTheta);
```