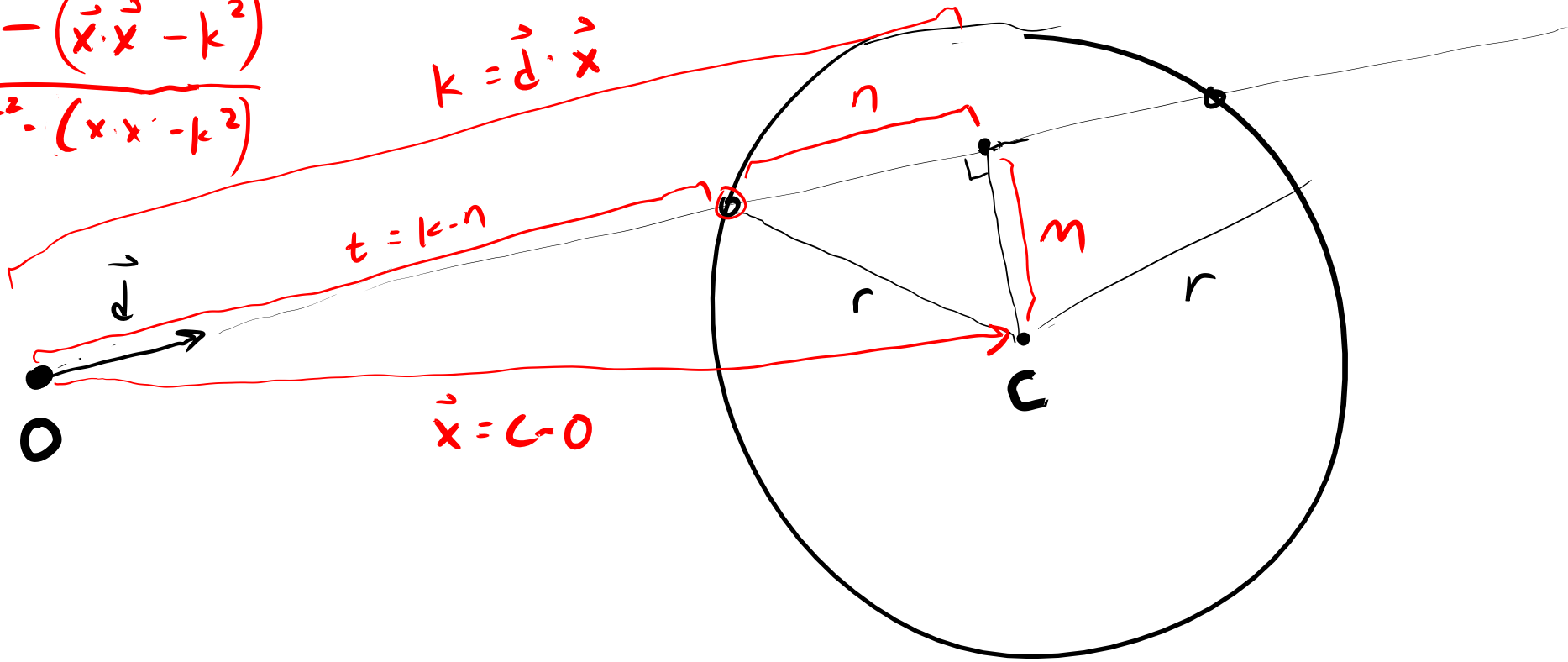
3D Screens

$n^2 + m^2 = r^2$

$\cos(\theta) = \frac{adj}{hyp}$

$n^2 = r^2 - (\vec{x}\cdot\vec{x} - k^2)$

$n = \pm\sqrt{r^2 - (x\cdot x - k^2)}$

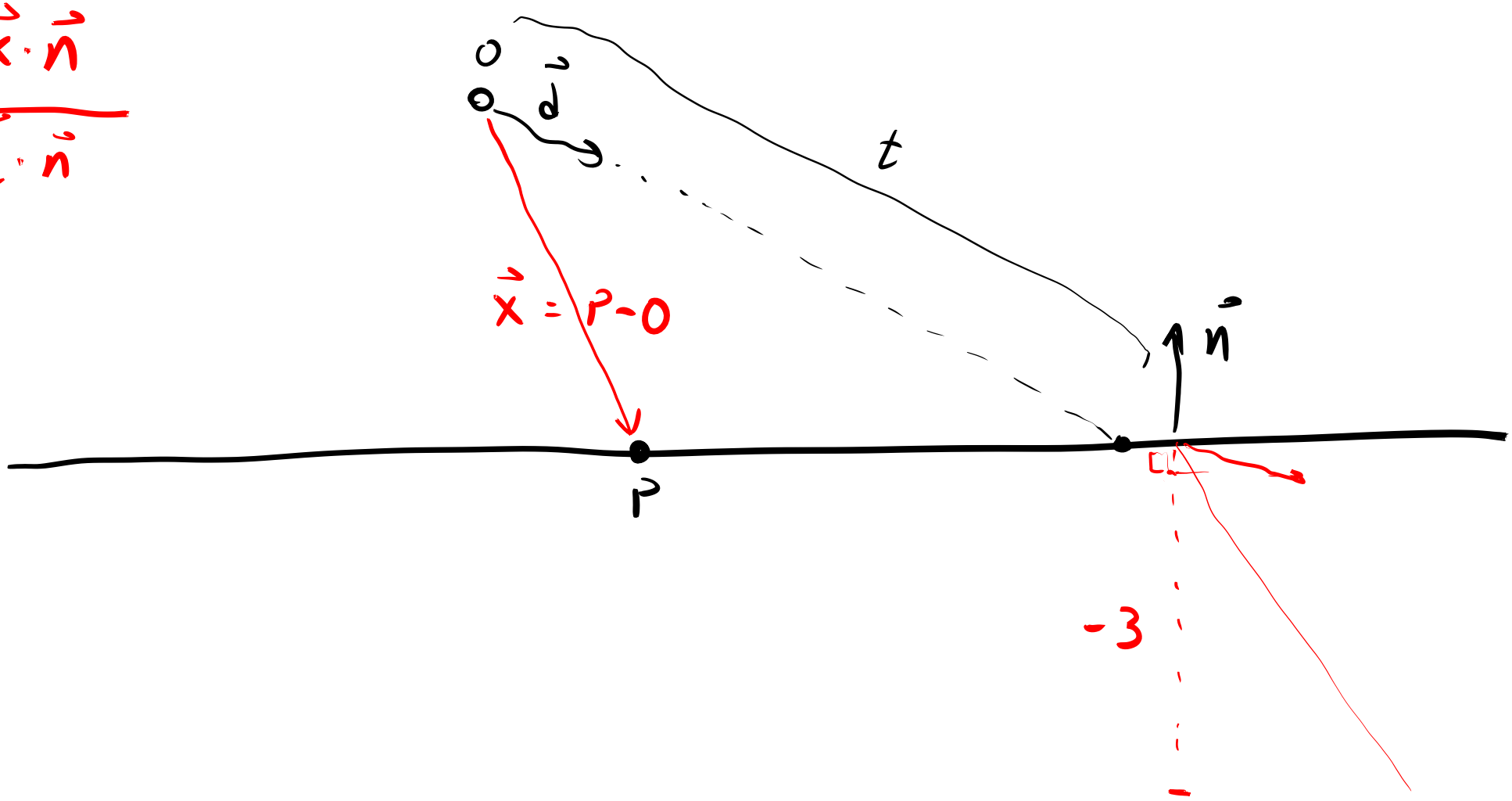


$m^2 + k^2 = |\vec{x}|^2 = \vec{x}\cdot\vec{x}$

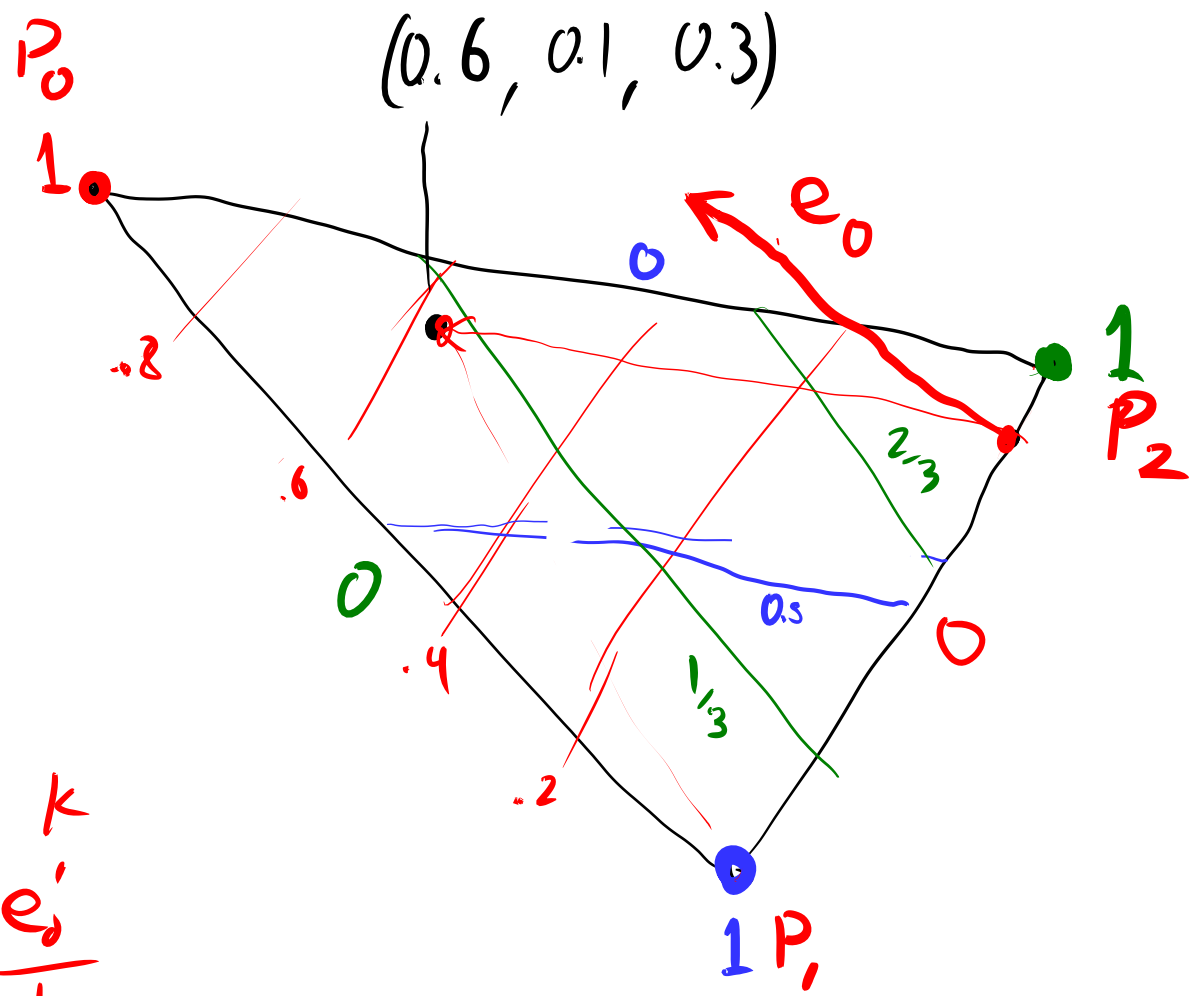
$m = \sqrt{\vec{x}\cdot\vec{x} - k^2}$

Plane

$$t = \frac{\vec{x} \cdot \vec{n}}{\vec{d} \cdot \vec{n}}$$



Triangle



Barycentric Coordinates

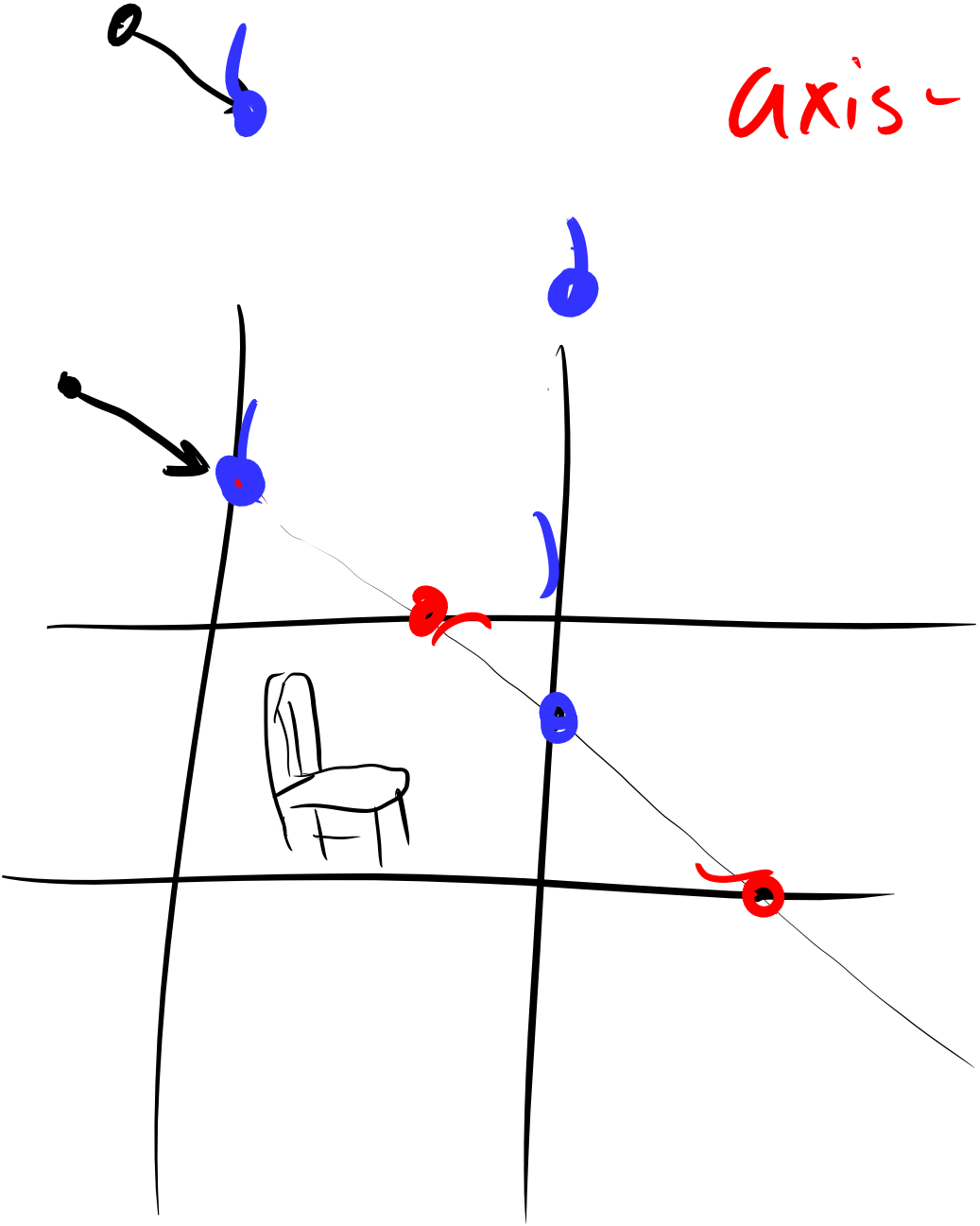
$$e_0' = \vec{n} \times (P_2 - P_1)$$

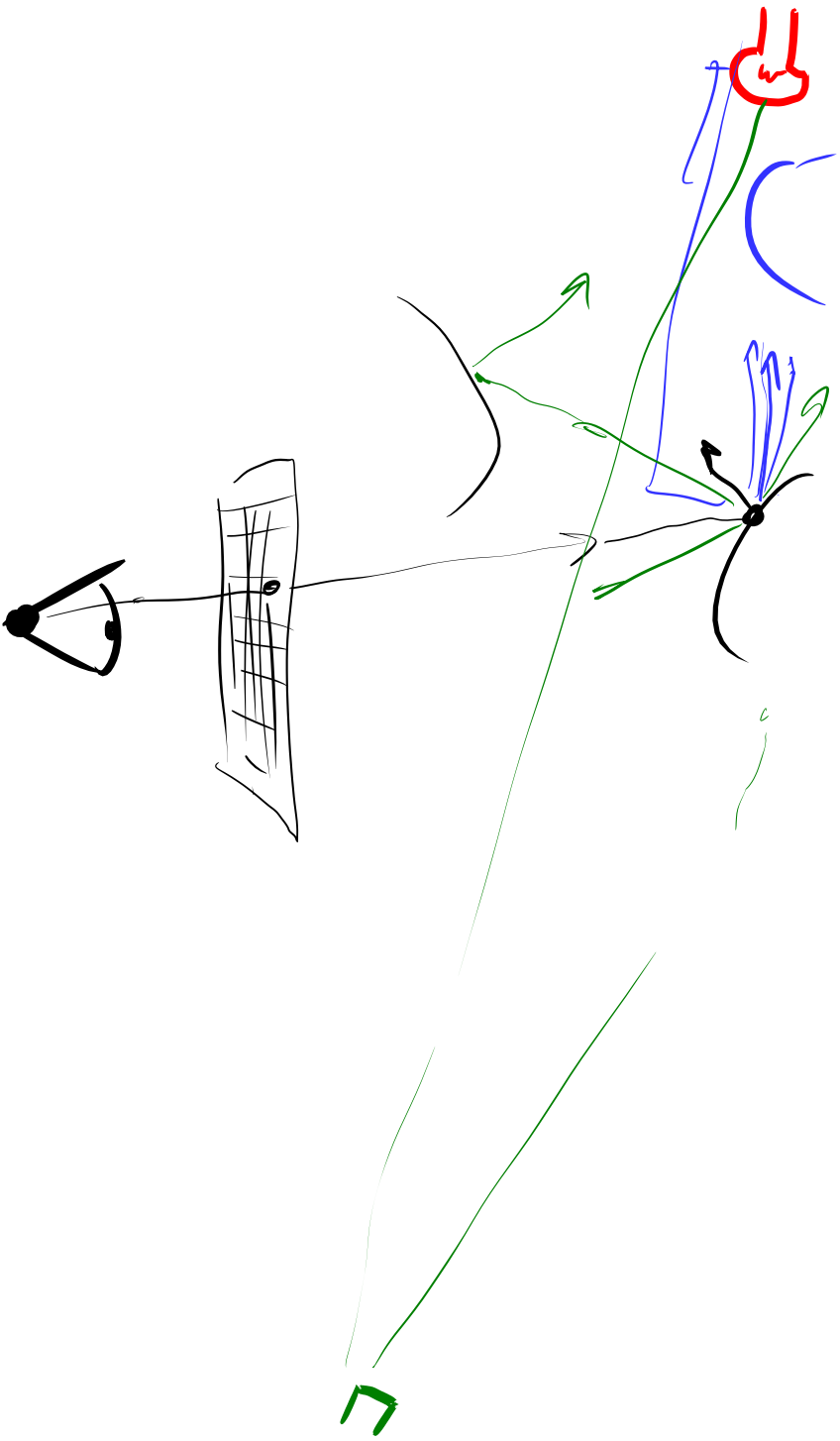
$$(P_0 - P_1) \cdot e_0' = k$$

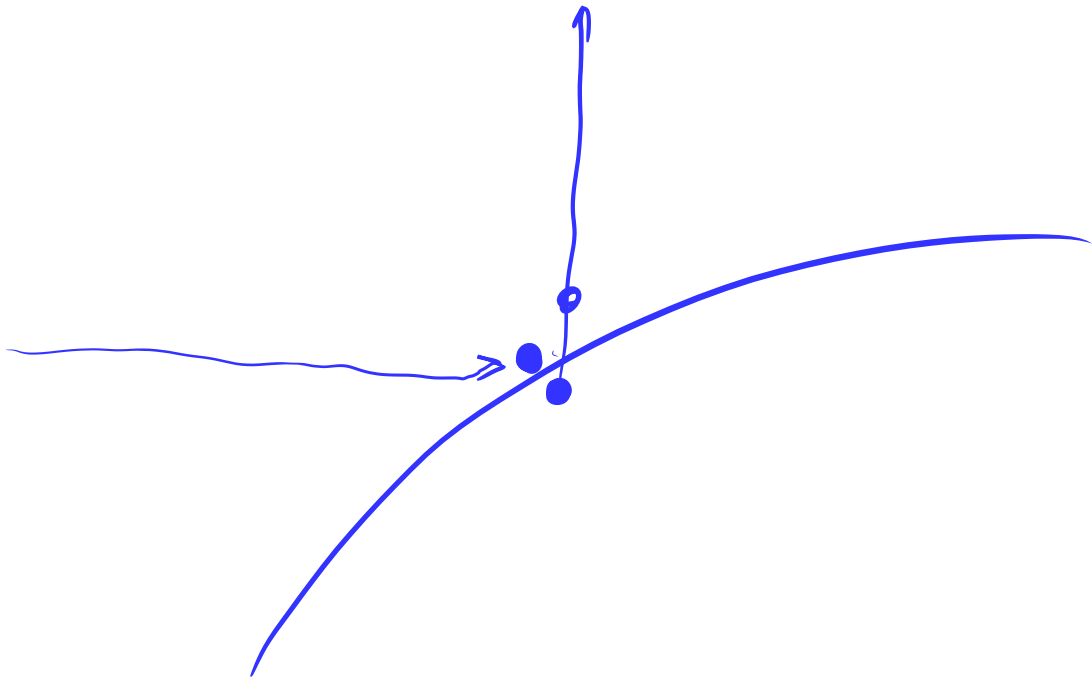
$$e_0 = \frac{e_0'}{k}$$

AABB

axis-aligned bounding box







$2^{20} \approx 10^6$

20 (1 million triangle)

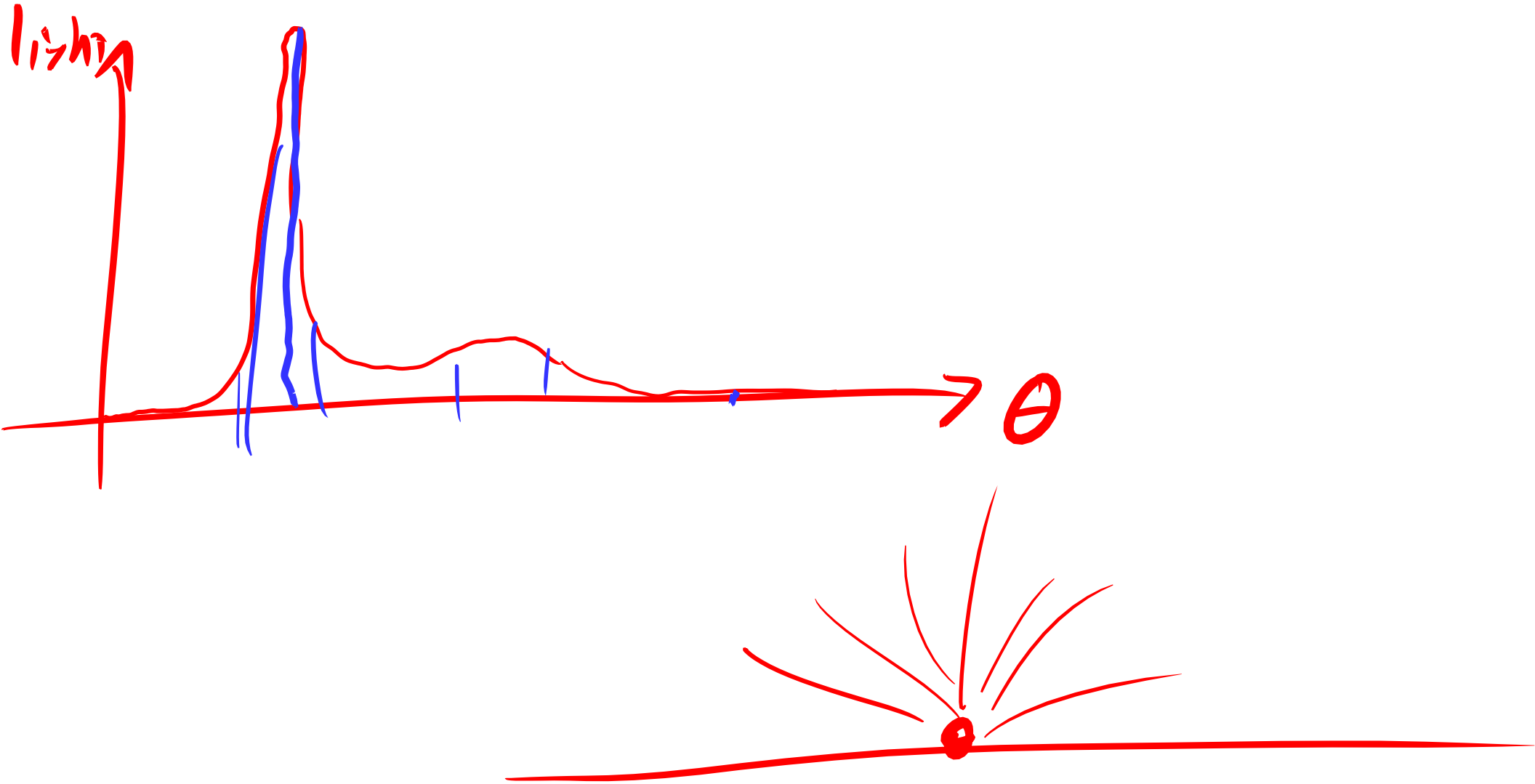
2 million pixels

100 rays per pixel

- ↳ prm
- ↳ shadow
- ↳ 2 GI
- ↳ 2 shadow
- ↳ $\frac{1}{4}$ · 2 rms
- ↳ $\frac{1}{4}$ · 1 shine
  - ↳ 3 ray for rand #

Sparse
Bundle
Hierarchy

importance sampling


Intensity
θ