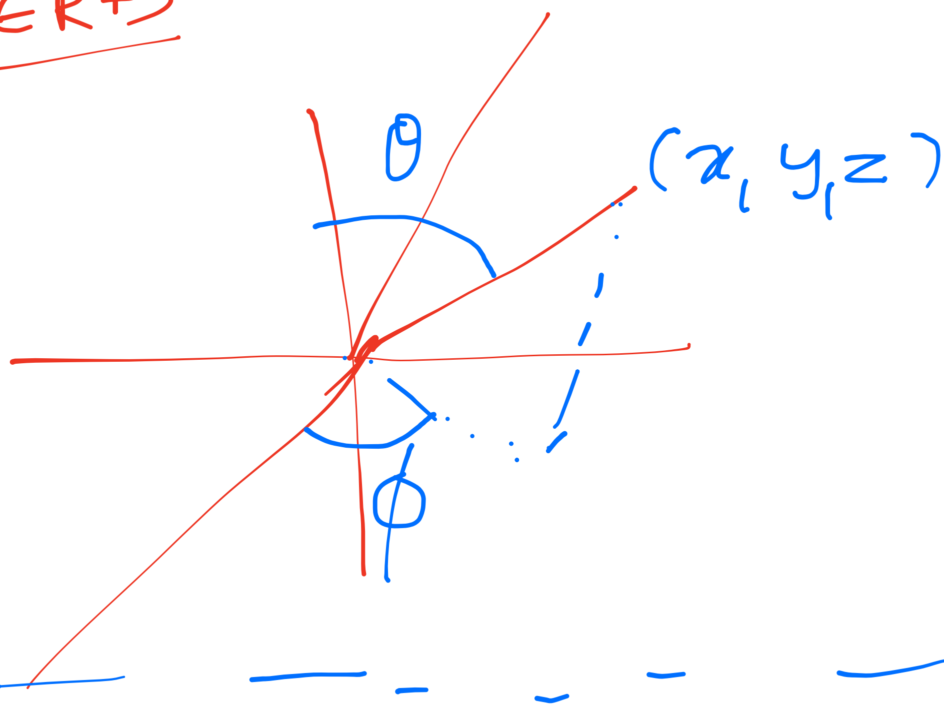
NERFS

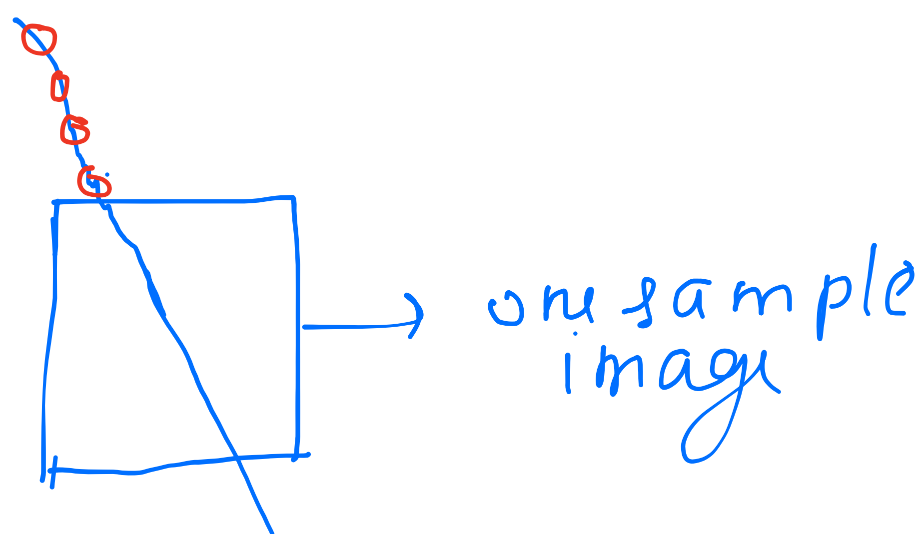


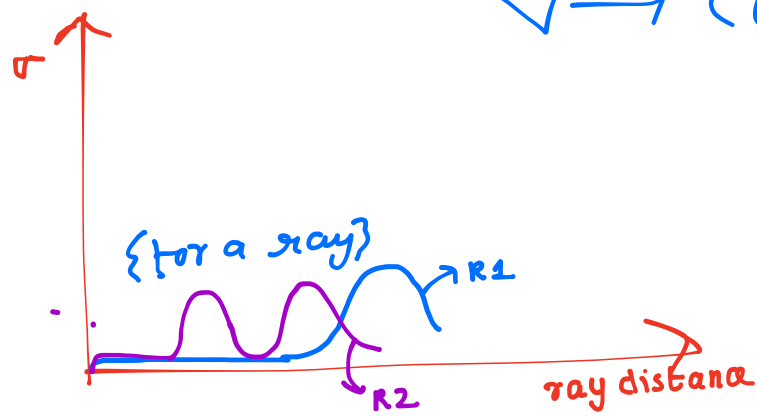
$$\{x\, y\, z\, \theta\, \phi\} \rightarrow (F_\Omega) \rightarrow (r, G, B, \sigma)$$

Key idea: overfit our neural network to the scene

→ only works for our preferred scene.

step - 1





Volume rendering

density at that pt.

$$C(r) = \int_{t_n}^{t_f} T(t)\,\sigma(r(t))\,c(r(t), d)\,dt \qquad T(t) = e^{-\int_{t_n}^{t} \sigma(r(s))\,ds}$$

color at point $(r(t))$ and $d = (\theta, \phi)$

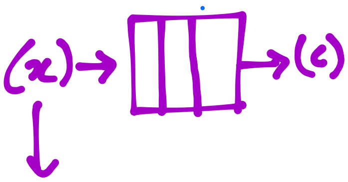
color for a particular ray

How much light has been blocked up to pt. t.

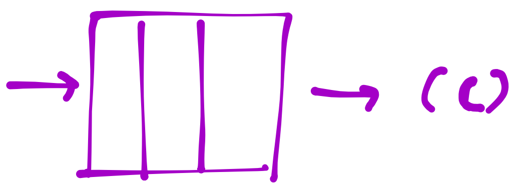
$$L = \sum_{r \in R} \left[\|\hat{C}_c(r) - C(r)\|_2^2 + \|\hat{C}_f(r) - C(r)\|_2^2 \right]$$

coarse sampling, fine sampling

Positional encoding



$\sin(x), \cos(x)$
$\sin(2x), \cos(2x)$
$\vdots$
$\sin(2^n x), \cos(2^n x)$



Hierarchal sampling