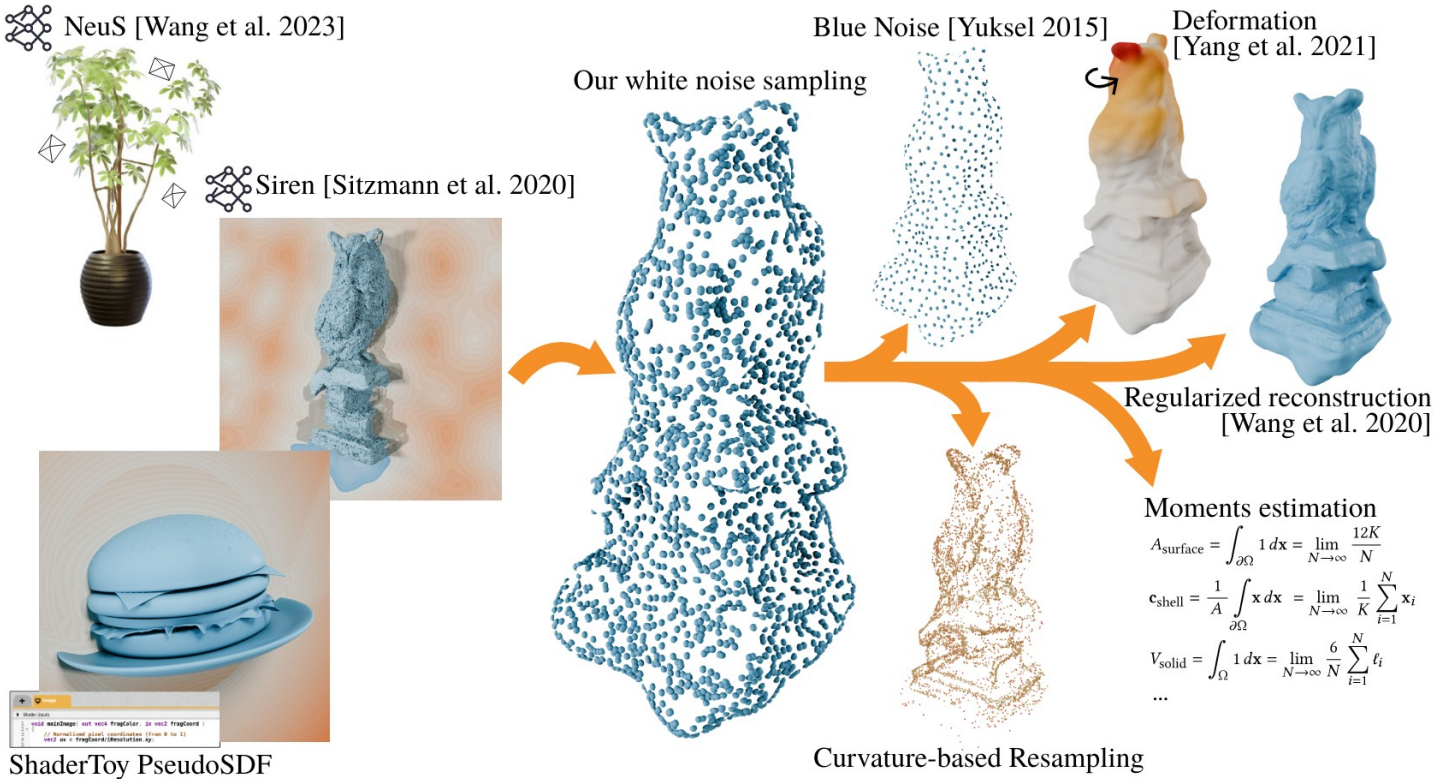
Groupe de lecture :

Uniform Sampling of Surfaces by Casting Rays



Buonomo Camille,
17/12/2025,

Selena Ling, Abhishek Madan, Nicholas Sharp, Alec Jacobson

1. Uniform sampling ...

- 1D :

$$f_{U([0,1])} = 1\, I_{[0,1]}$$

- Sur une surface :

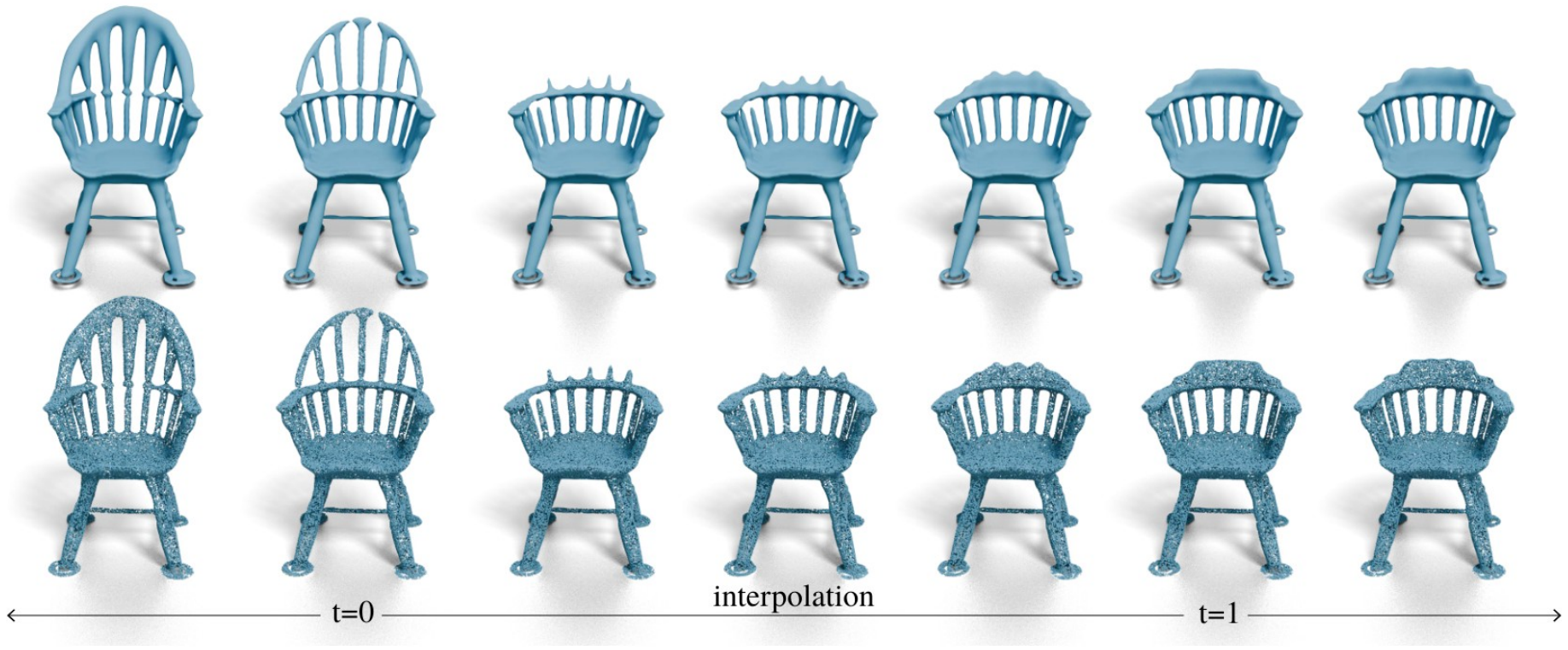
$$f_{U(S)} = \frac{1}{\lambda(S)} I_S$$

ratio of samples belonging to each local surface region should
be the same as the area ratio of the local region

→ La proportion d'echantillons appartenant a une region doit être le ratio de l'aire region sur la surface totale

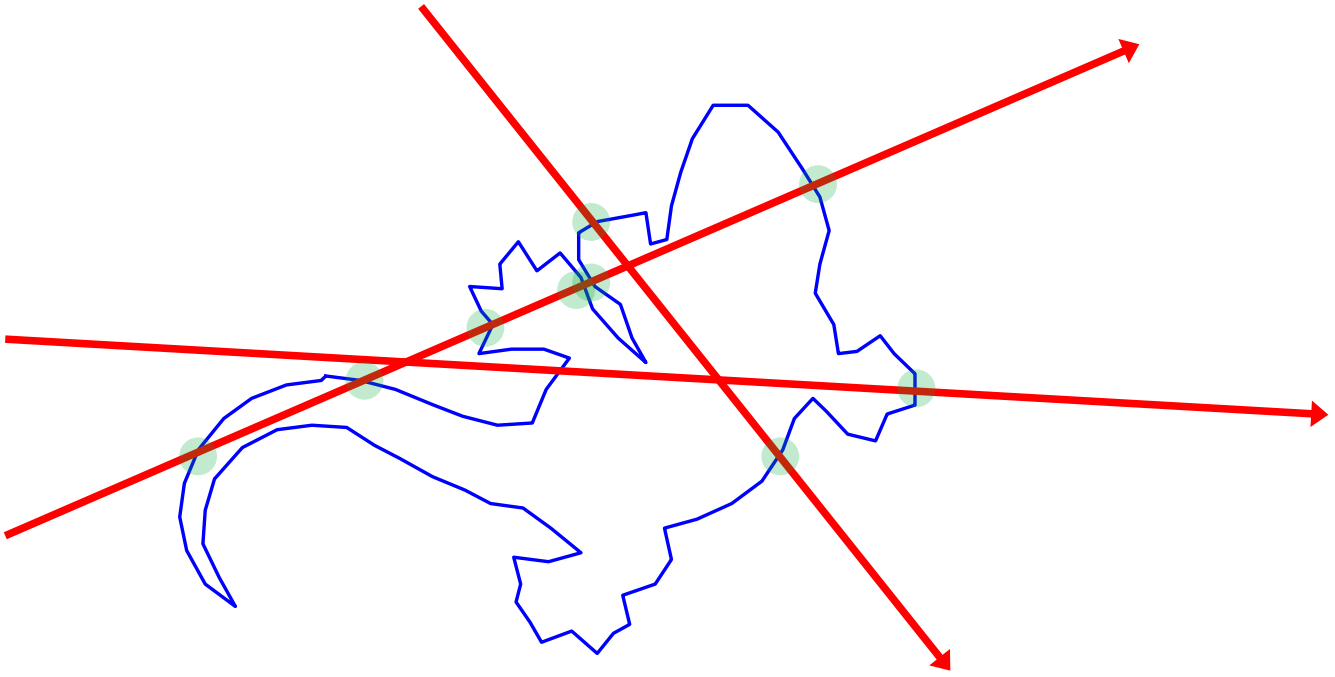
$$\# \frac{(x_i \in A)}{n} = \frac{A}{S}$$

2. … Of surfaces ...



→ Besoin d’un critere d’appartenance a la surface

3. … By casting rays.



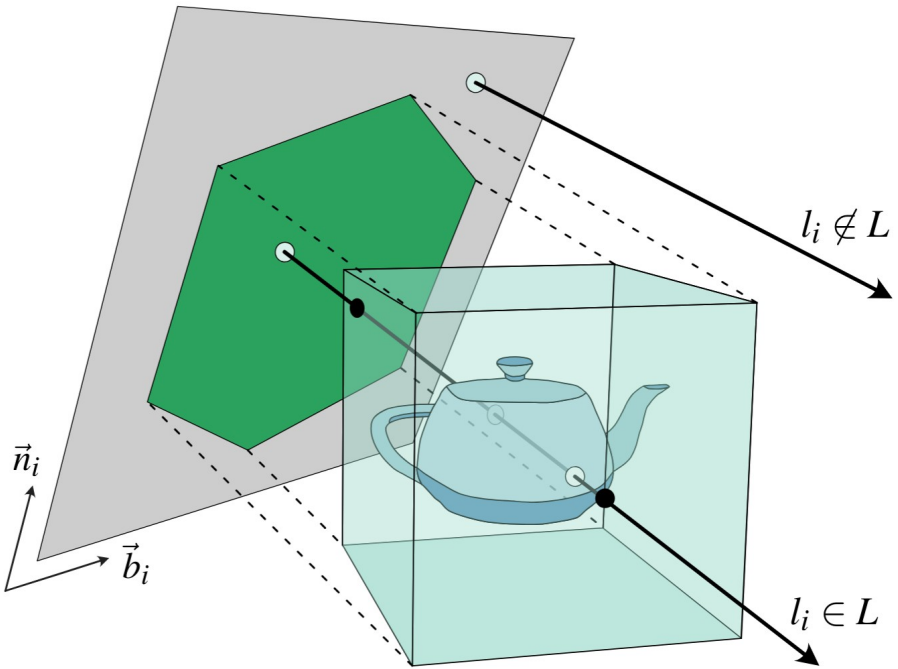
$$A(S) \approx \frac{\#\,Intersections(l, \partial S)}{\#\,l} C_d$$

(formule de Crofton)

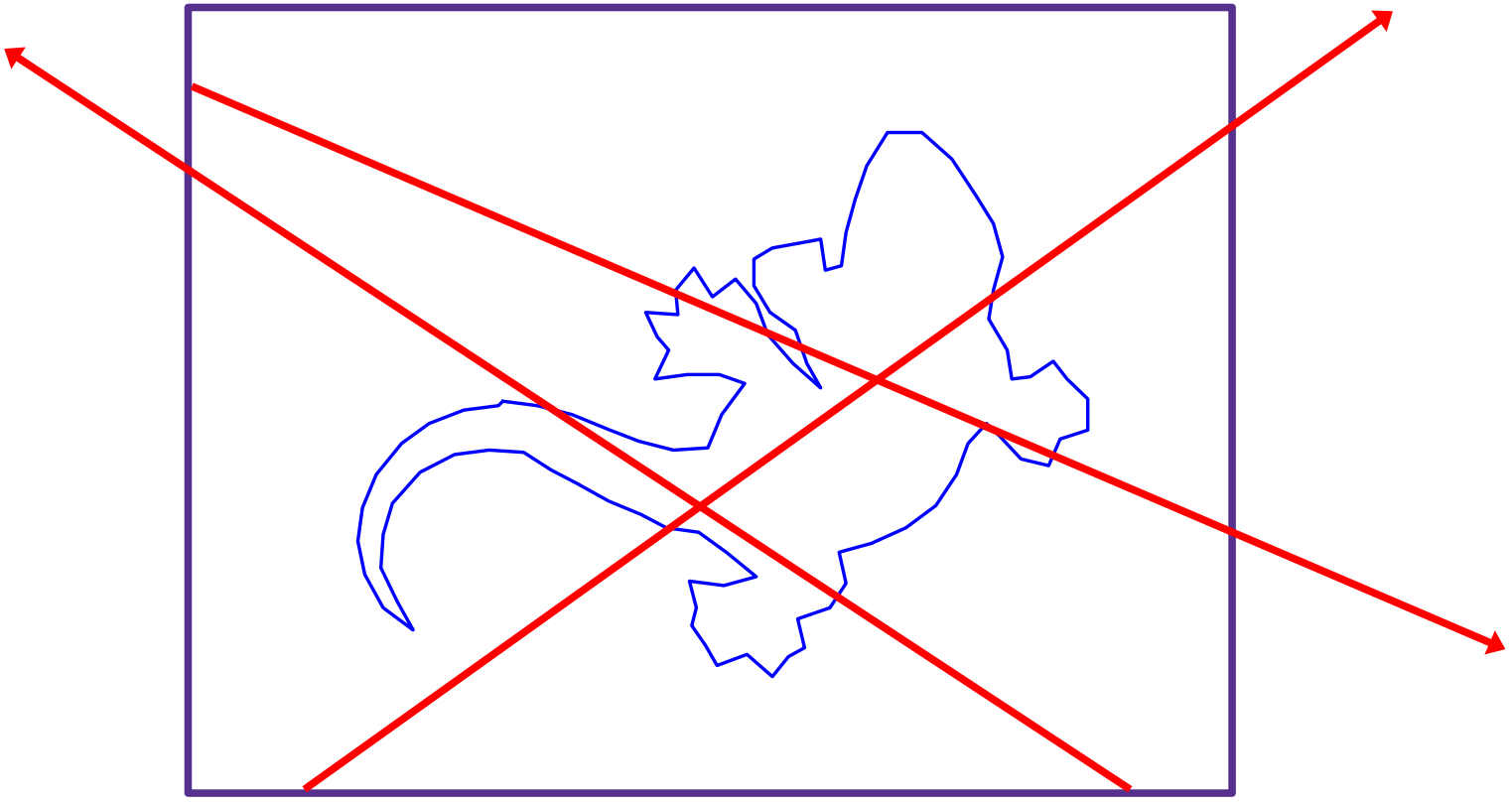
4. Uniform Sampling of Surfaces by Casting Rays

Problème : Comment assurer une répartition uniforme des échantillons ?

- Répartition lié à la distribution des rayons



5. Mais dis moi Jamy ?



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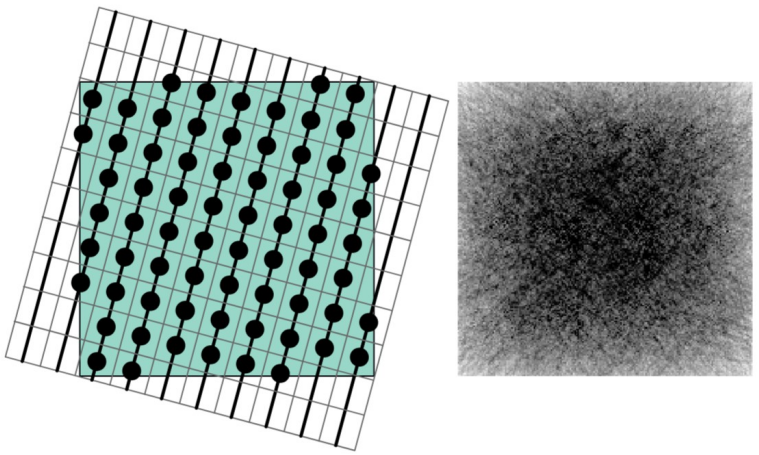
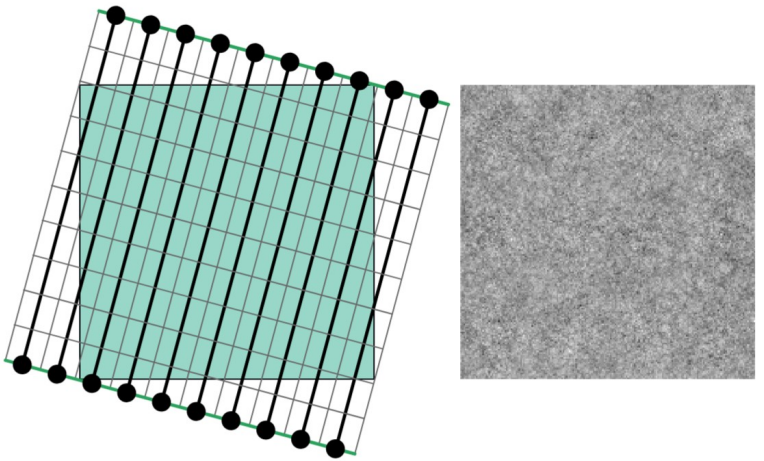


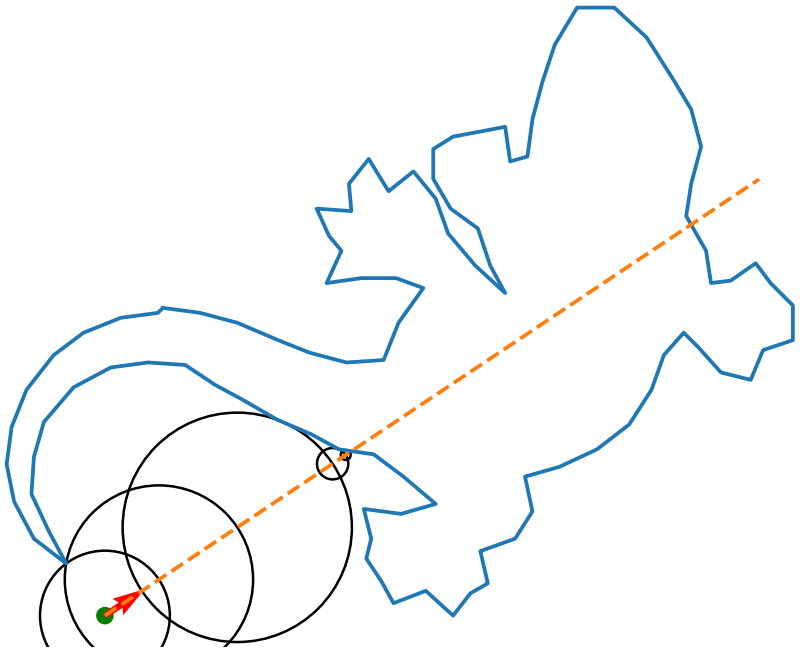
Random Point in Box
(Non-Uniform)



Random Point in Normal Space
(Uniform)

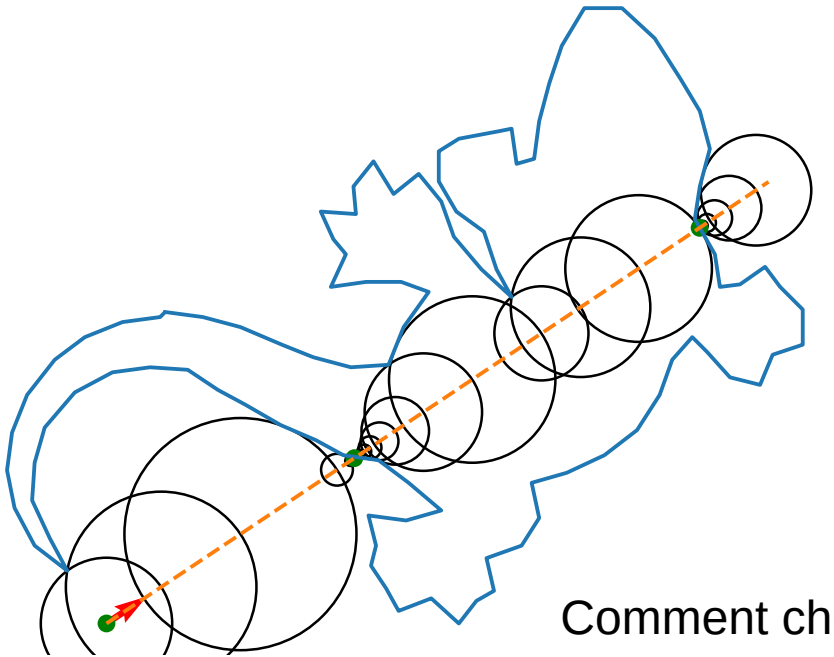
6. Rays intersection evaluation

- Sphere tracing X



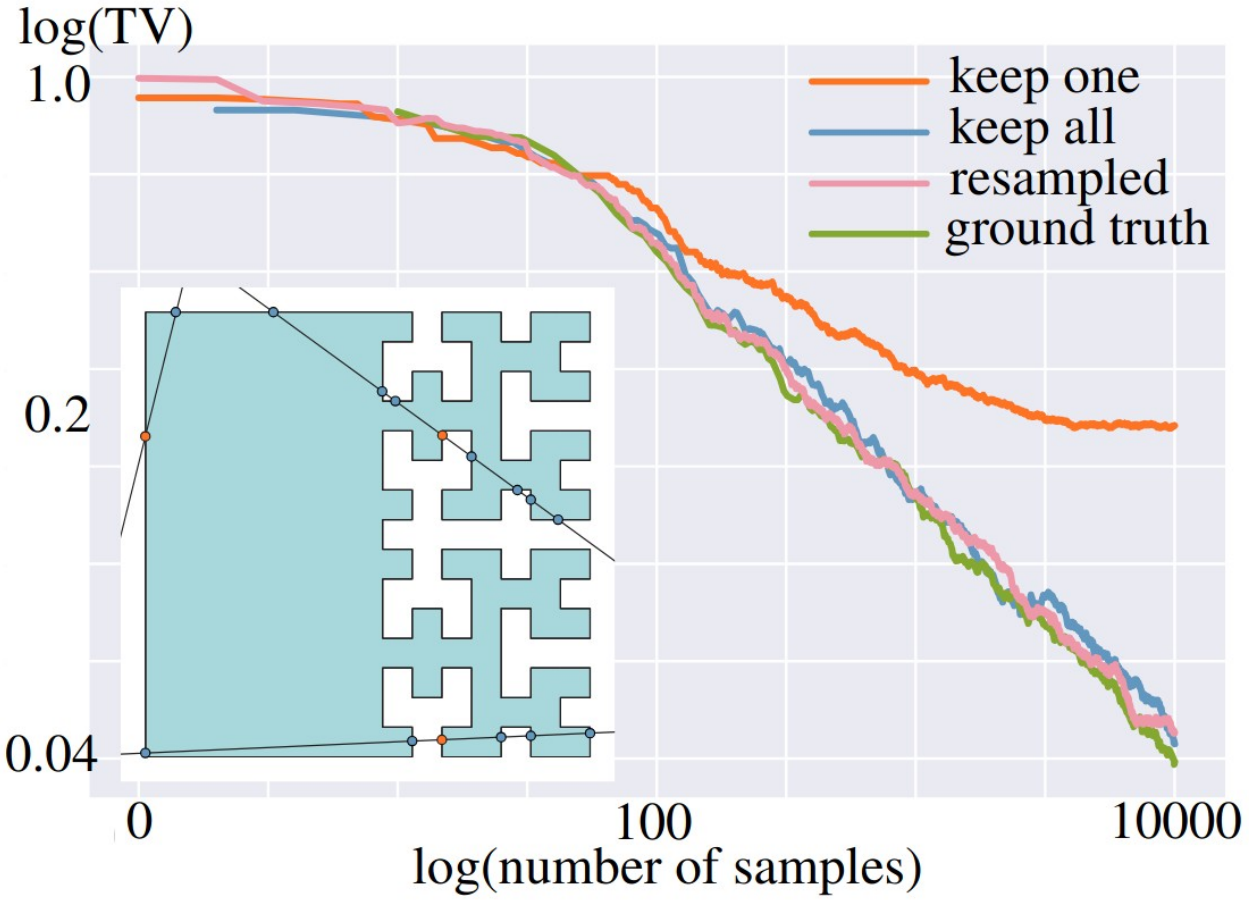
6. Rays intersection evaluation

- Sphere tracing …



Comment choisir les points ?

7. Validation



8. Performance