1-Lipschitz Neural Distance Fields

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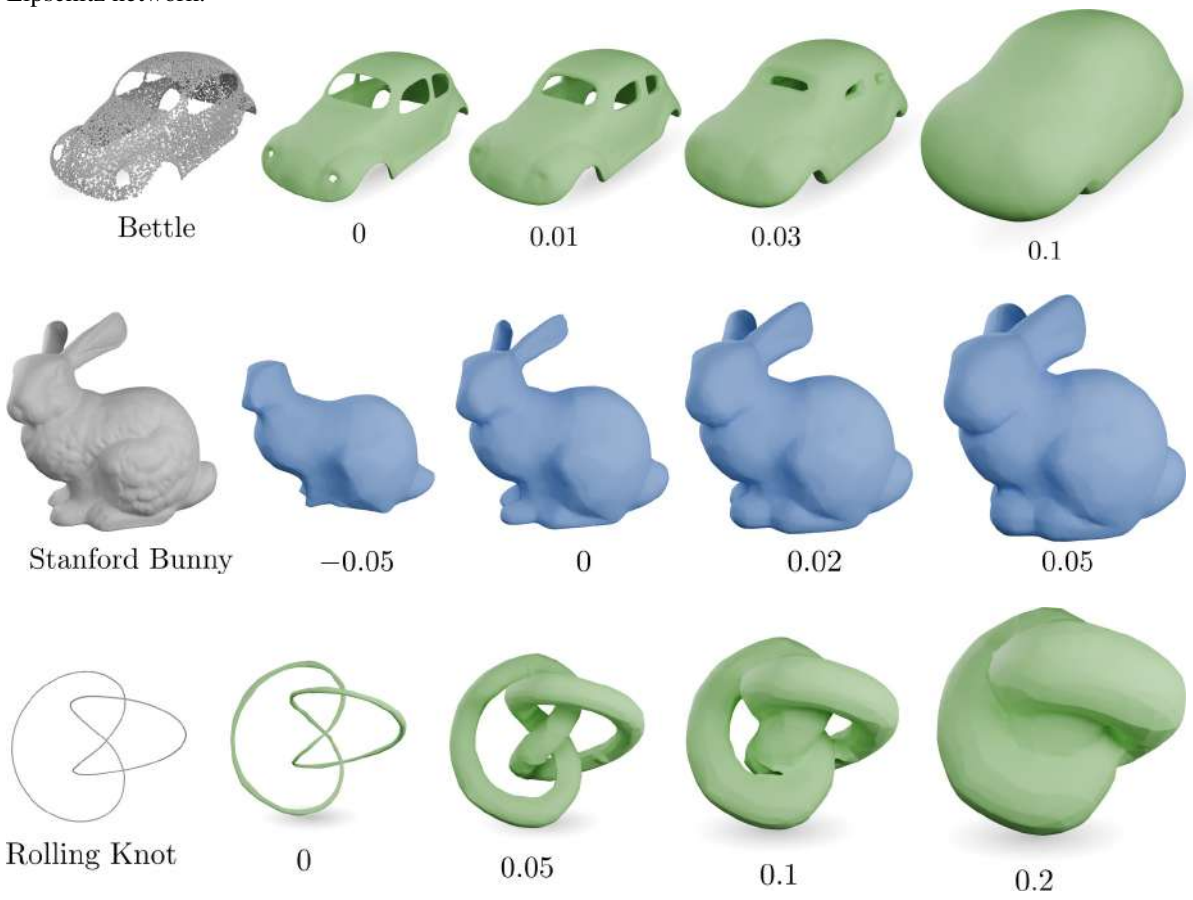
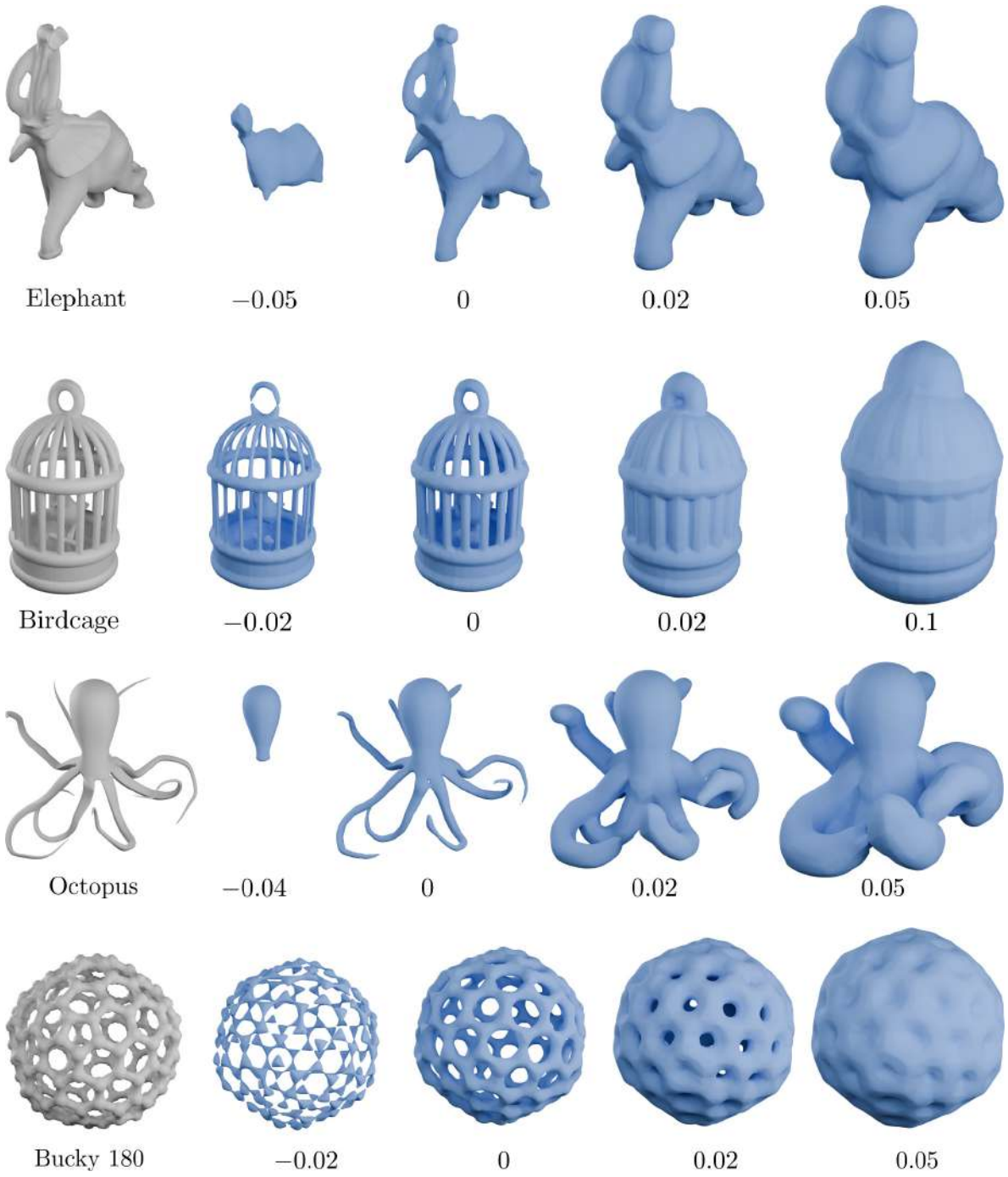
Supplementary material

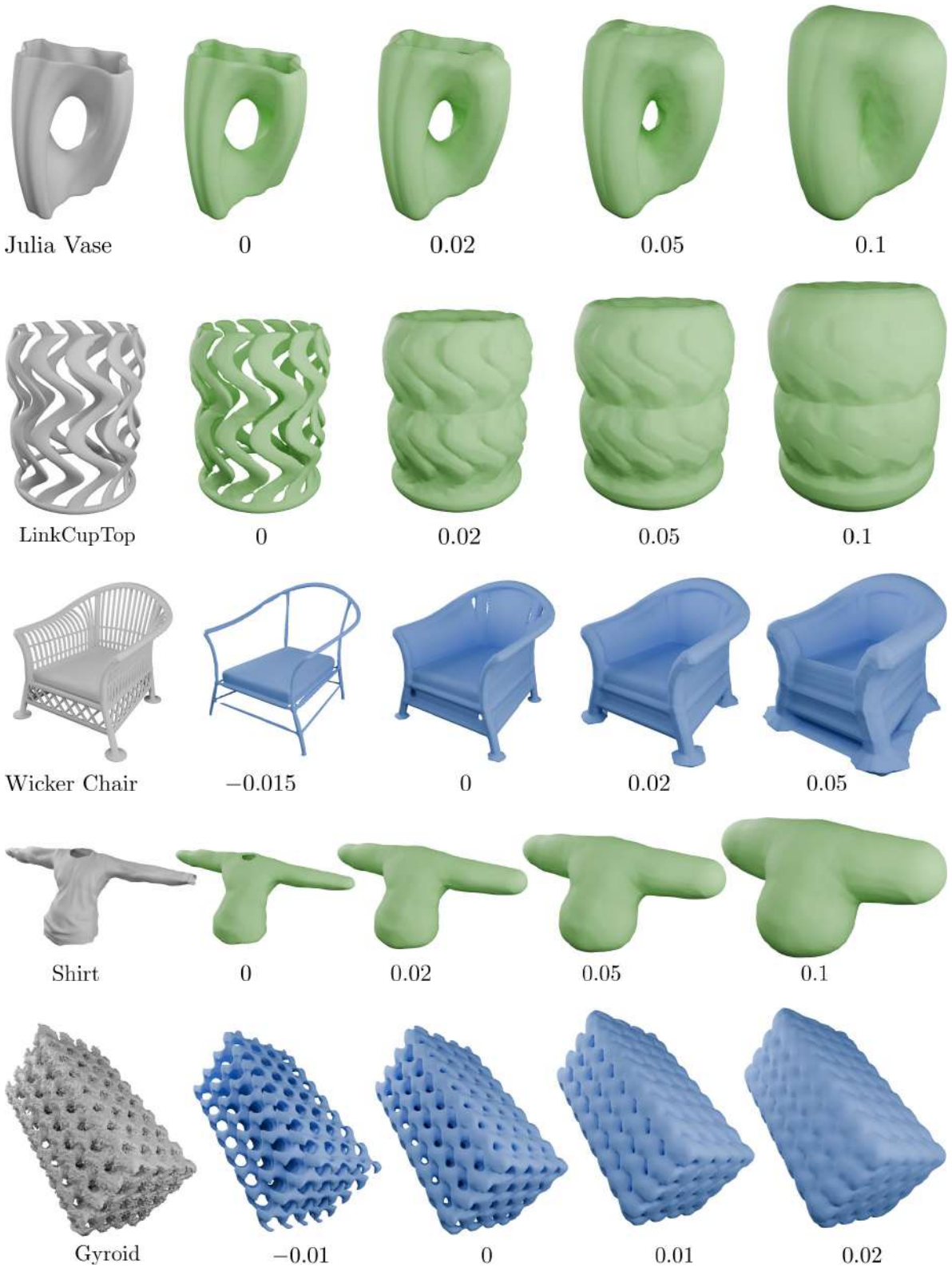
1 Isosurface extraction

In this section, we extract isosurfaces for different values of the distance on a larger variety of models. Classical models of geometry processing, namely the *Stanbford bunny* and the *bettle* model can be accessed here: https://github.com/alecjacobson/common-3d-test-models?tab=readme-ov-file. Models from the *Rolling knot* onward are from the Thingi10K dataset [ZJ16]. The *Shirt* model is taken from the MGN dataset [BTTPM19]. The Gyroid is a noisy triangle soups of 2.9M faces with 3000 tiny connected components.

Signed distance fields (using the inside/outside partition of points) are depicted in blue, while unsigned distance fields are green. Interesting failure cases are the *Wicker Chair* model, on which our method was not capable to capture all the details, and the *Shirt* model, where holes at the end of sleeves are missing. We believe that both issues can be resolved by greatly increasing the number N of sampled points and the size of the Lipschitz network.

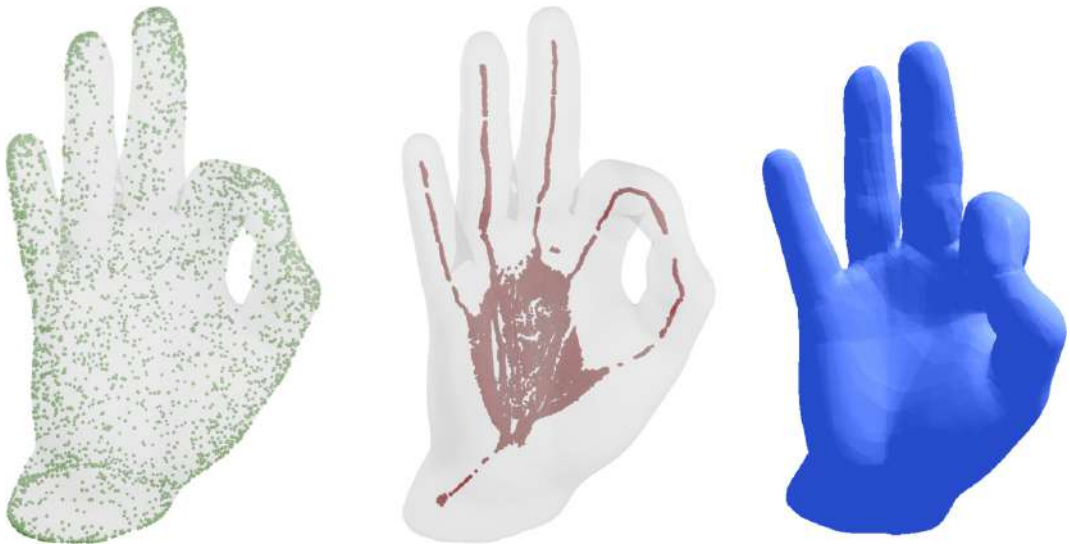



Elephant
−0.05
0
0.02
0.05
Birdcage
−0.02
0
0.02
0.1
Octopus
−0.04
0
0.02
0.05
Bucky 180
−0.02
0
0.02
0.05

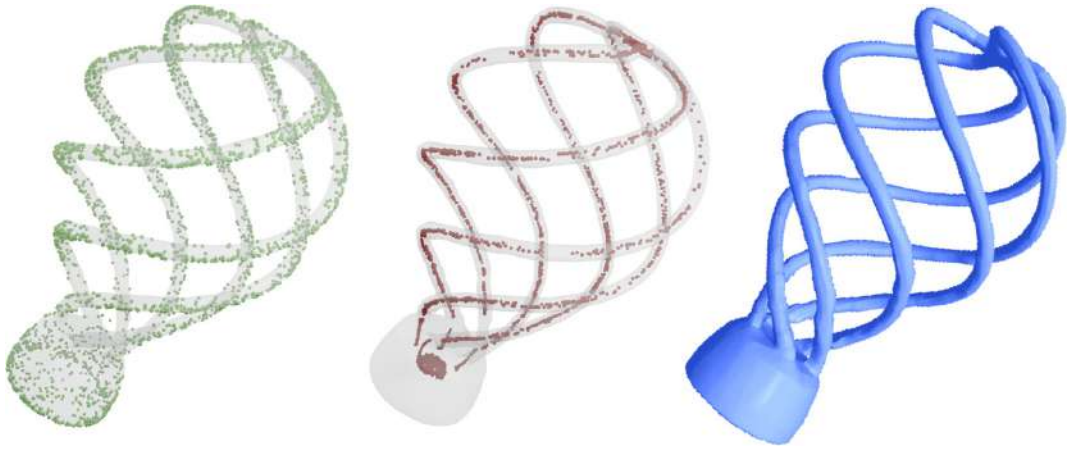

Julia Vase
0
0.02
0.05
0.1
LinkCupTop
0
0.02
0.05
0.1
Wicker Chair
−0.015
0
0.02
0.05
Shirt
0
0.02
0.05
0.1
Gyroid
−0.01
0
0.01
0.02

2 Sampling and Ray marching

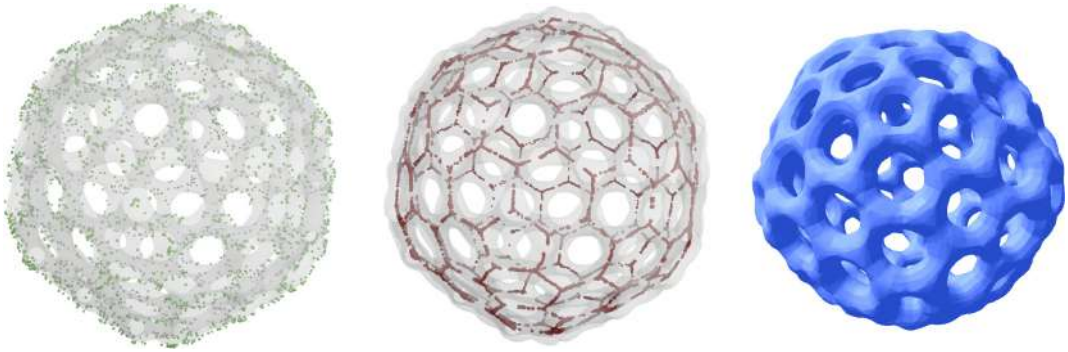
Here, we perform geometrical queries on different models, namely sampling of the zero level set (left column, green points), sampling of the medial axis (middle column, red points) and ray marching rendering (right column).



Hand



Lightbulb



Bucky180

Birdcage

References

[BTTPM19] BHATNAGAR B. L., TIWARI G., THEOBALT C., PONS-MOLL G.: Multi-garment net: Learning to dress 3d people from images. In *IEEE International Conference on Computer Vision (ICCV)* (oct 2019), IEEE.

[ZJ16] ZHOU Q., JACOBSON A.: Thingi10k: A dataset of 10,000 3d-printing models. *arXiv preprint arXiv:1605.04797* (2016).