NPM3D – TP5: Surface Reconstruction

YANG Antoine, MVA2019-2020, antoineyang3@gmail.com

A.   3D Reconstruction on MeshLab

Question 1:

I tuned the cited parameters to try to have the best compromise between geometric details of the surface, minimum unwanted holes and minimum vertices of the mesh. For RIMLS, which I found to be very sensible to the parameters, I used filter scale 4 and grid resolution 250 for Bunny, and filter scale 8 and grid resolution 400 for the Dragon. For Poisson, default parameter (reconstruction depth 8) already gives good results for both Bunny and Dragon.
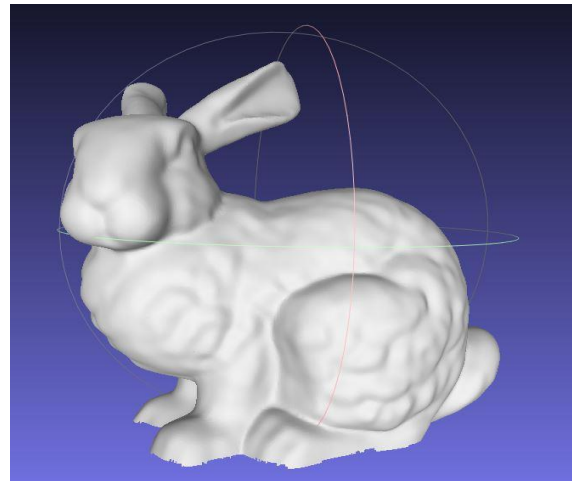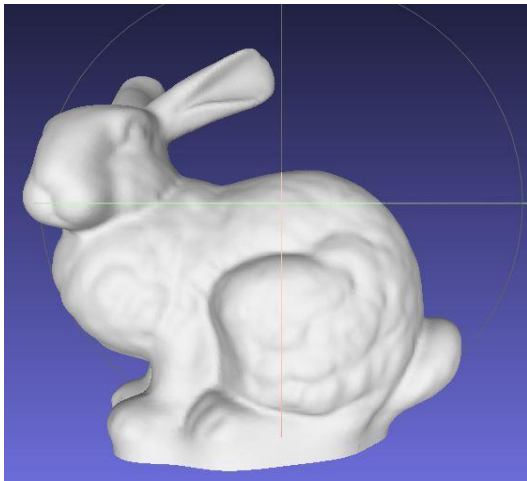


Poisson (left) vs RIMLS (right) for Bunny
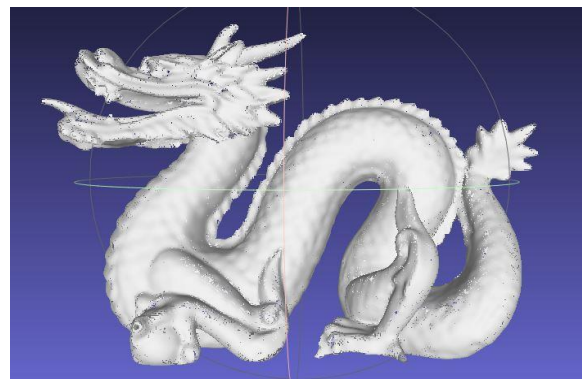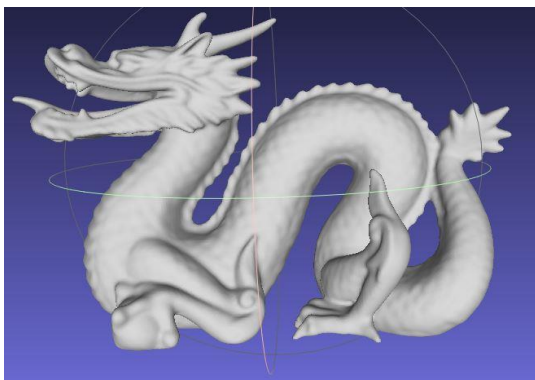
Poisson (left) vs RIMLS (right) for Dragon

Question 2:

Poisson with default parameters (reconstruction depth 8, 1.5 minimum samples, interpolation weight 4) gives the best results (42002 vertices and 82903 faces for Bunny; 137347 vertices and 274702 faces for Dragon).
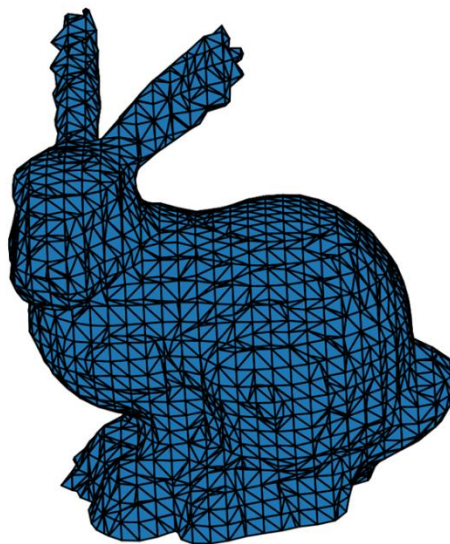
B. Surface Reconstruction on Python: implement the Hoppe implicit function

Question 3:
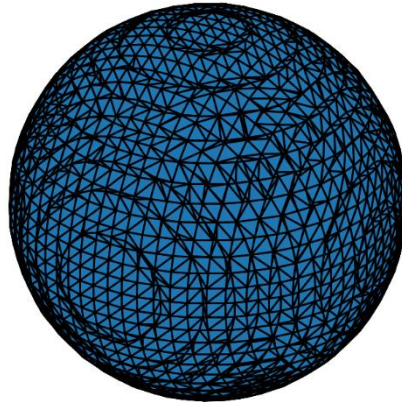
*Iso-zero surface of the sphere point cloud*

Question 4:

Iso-zero surface of the bunny point cloud

C. Implement the EIMLS function (BONUS)

Question 5:

I implemented the EIMLS function. The only difference I can notice is at the right foot of bunny, which has sharper edges with the Hoppe function, while the result is nicely smooth with the EIMLS function. This might be due to the non-continuity of the Hoppe representation.
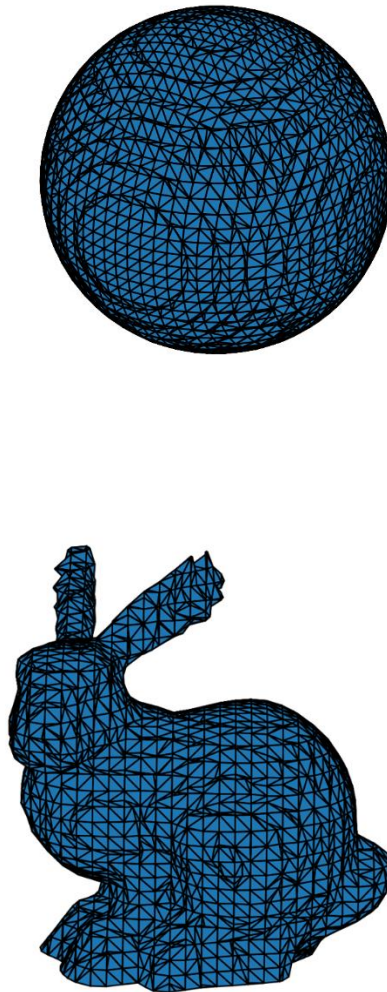
EIMLS method on sphere and bunny