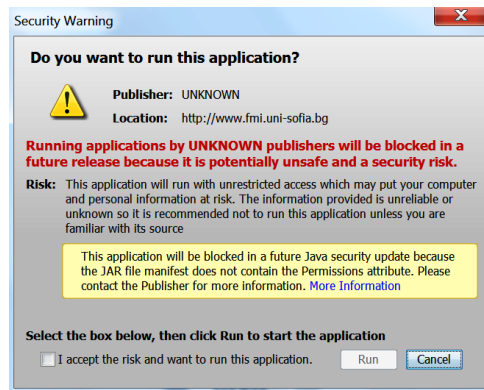


User Guide

To view the applet you should have installed **JAVA 7 32-bit**, (`jre-7u79-windows-i586.exe`, www.java32bit.com) and **JAVA 3D** (`j3d-1_5_2-windows-i586.exe`). For a user's convenience there is a link to the downloads of the corresponding Internet site (java3d.java.net.html). In case Firefox is your browser it should be 32-bit. Moreover, you should set Security Level – >Medium in Java Control Panel.

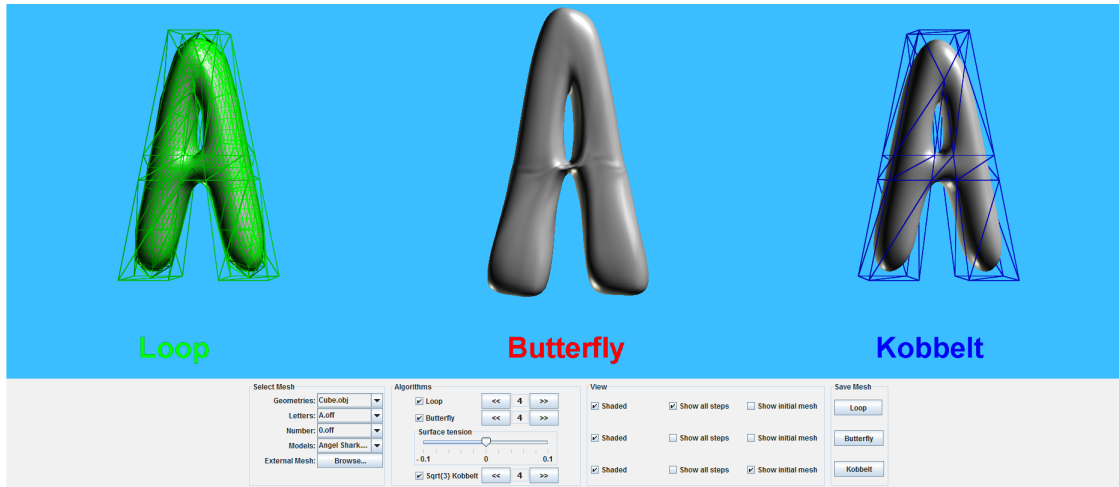
1 Description of the Graphics Interface and Functionality

- The applet is signed to allow access to the user's local file system so the user must confirm the signature after starting the applet.



- The initial mesh can be chosen either from four drop-down lists, or can be loaded from an external file.
- The package works with arbitrary closed polygonal meshes. In case the input mesh is not a triangle mesh, the program automatically triangulates it using the Java 3D class `Triangulator` and then proceeds as usual.

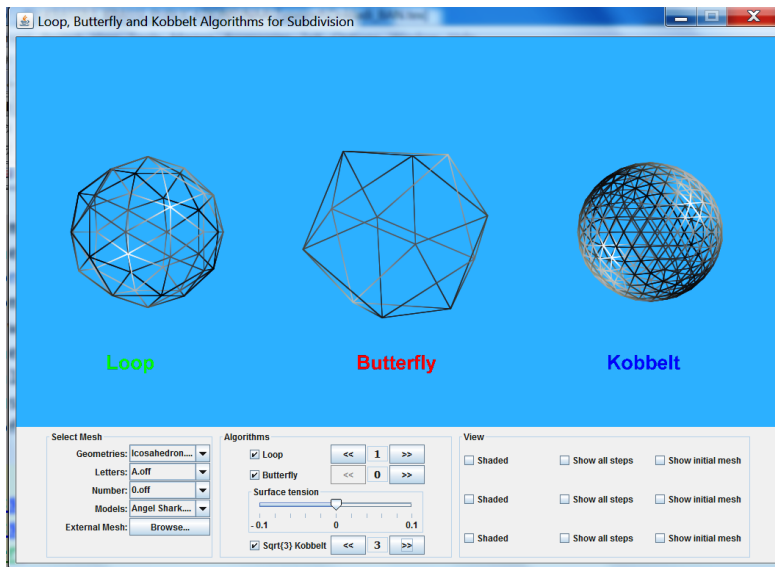
- Graphics interface of the applet:



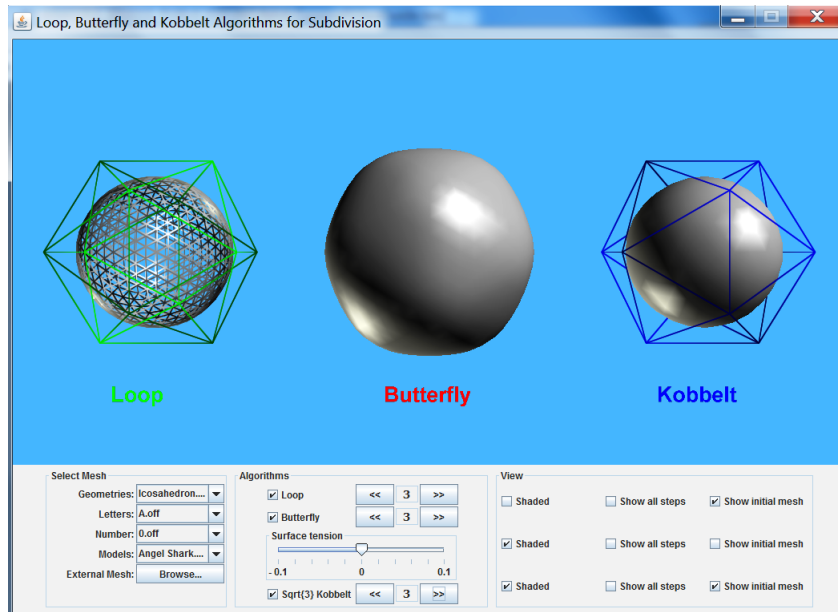
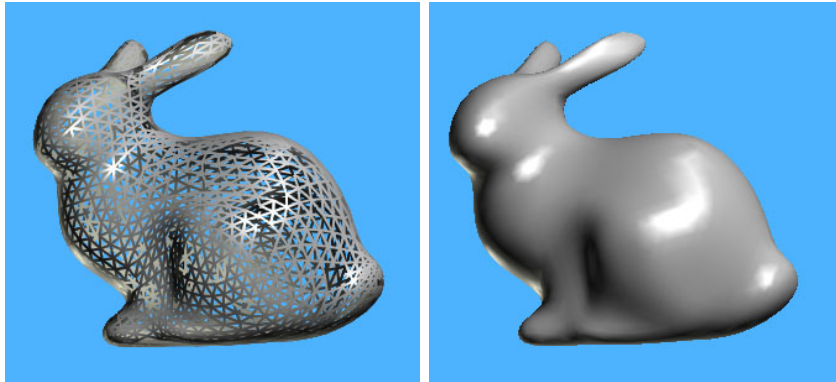
Instructions:

- 1) Left-Click and drag with the mouse to rotate object
- 2) Right-Click and drag with the mouse to translate object
- 3) ALT + Left-Click and drag up and down to zoom in/out on object

- The level of subdivision can be controlled.

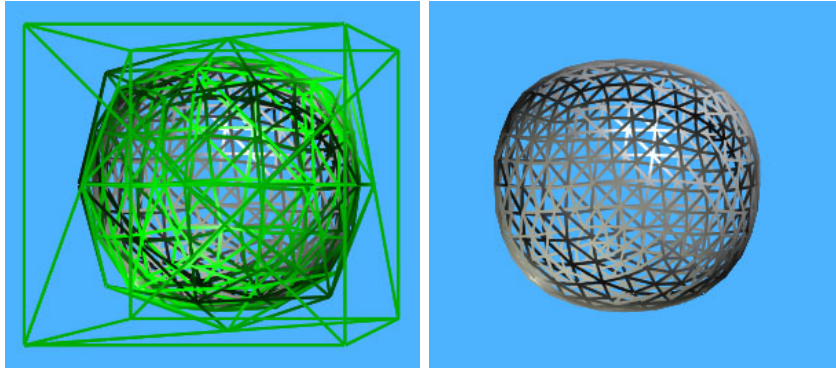


- The applet visualizes the meshes in two modes: *Wireframe* and *Shaded*. *Wireframe* mode is more convenient to demonstrate and analyze the subdivision process while *Shaded* is appropriate to study and compare the shape and the smoothness of the obtained surfaces.

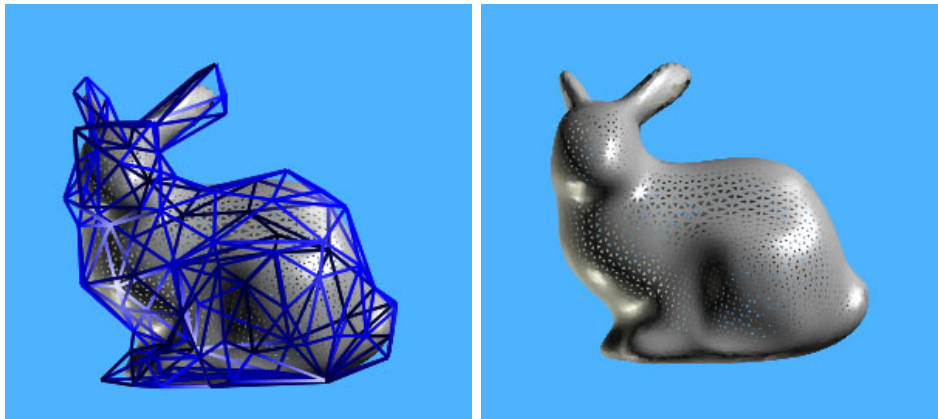


- Additional options *Show All Steps* and *Show Initial Mesh*:

- *Show all steps*



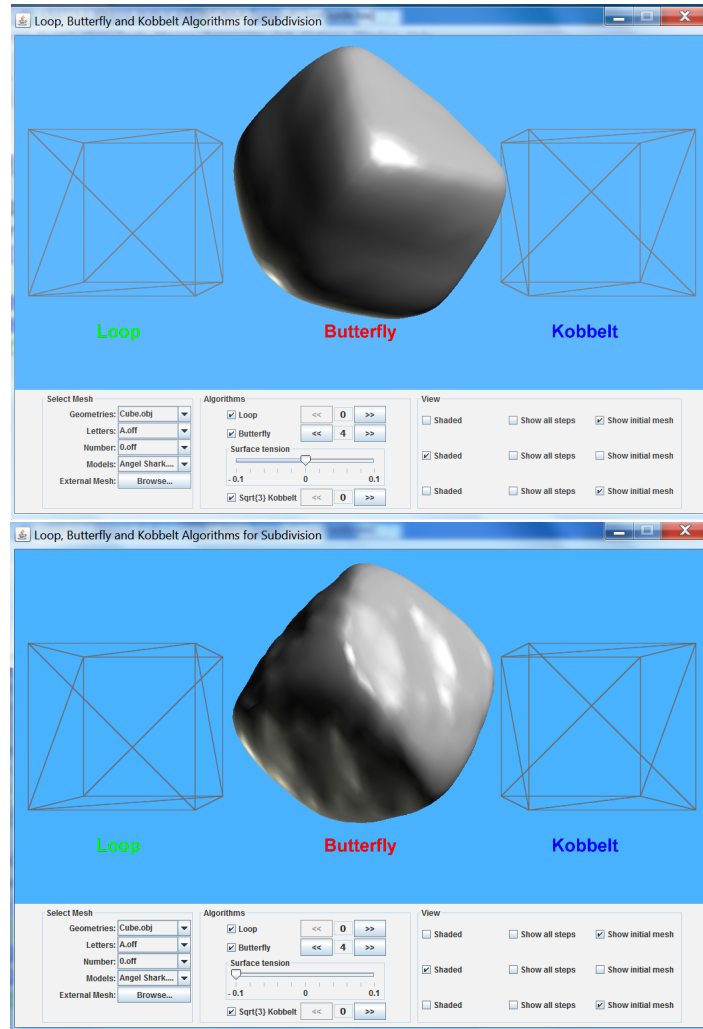
- *Show initial mesh*



- The surfaces can be edited interactively by rotation, translation and resizing using the mouse.

- *Rotate*: left mouse button (press, hold and move)
- *Translate*: right mouse button (press, hold and drag)
- *Resize*: scroll mouse button (press, hold and move)

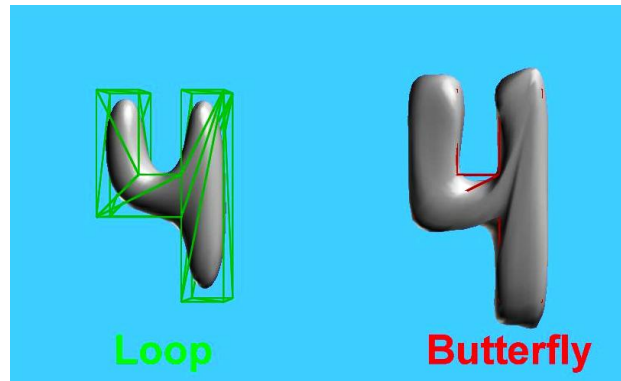
- An additional slider *Surface tension* allows the adjustment of the tension parameter $w \in [-1, 1]$ for Modified Butterfly algorithm.



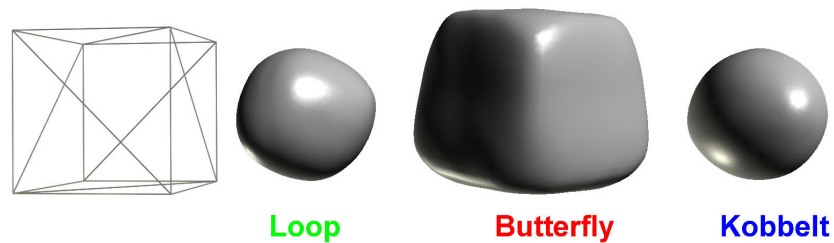
- The generated mesh at each subdivision level can be exported as .obj file in a temporary directory on user's system. The directory's name appeared in the Java console. The name of the file is Mesh-{scheme}{level of subdivision}.obj, e. g. Cube-Loop2.obj.

2 Visual Comparison

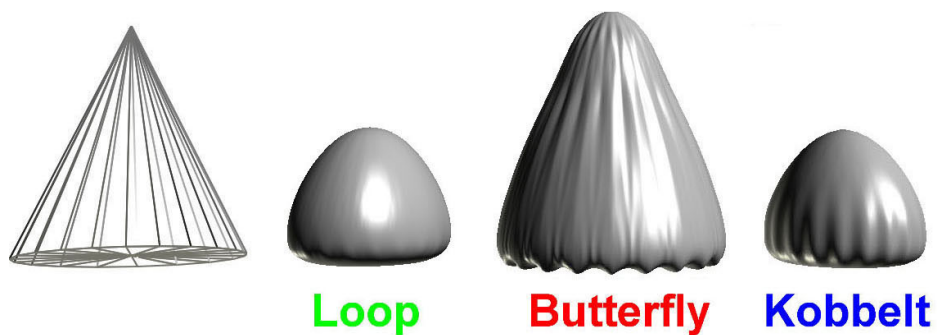
- Interpolating or approximating



- Cube after 4 steps



- Cone after 4 steps



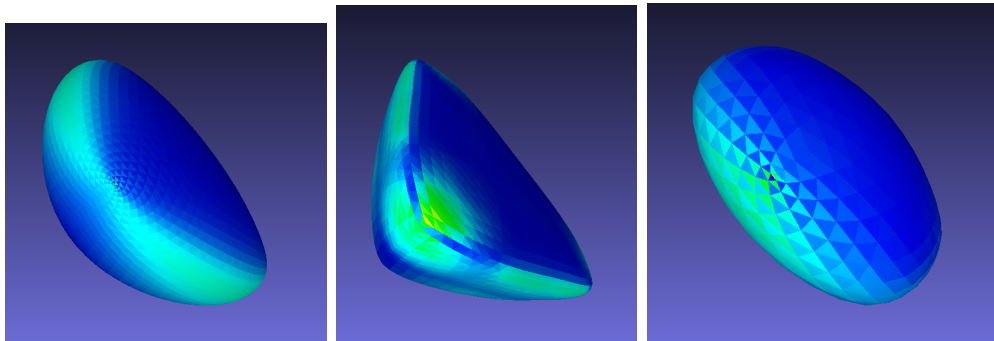
3 Visual Comparison of the Regularity w.r.t. the Aspect Ratio

The visualization of the regularity w.r.t. the aspect ratio is created using Meshlab, Visual Computing Lab-ISTI-CNR, <http://meshlab.sourceforge.net>.



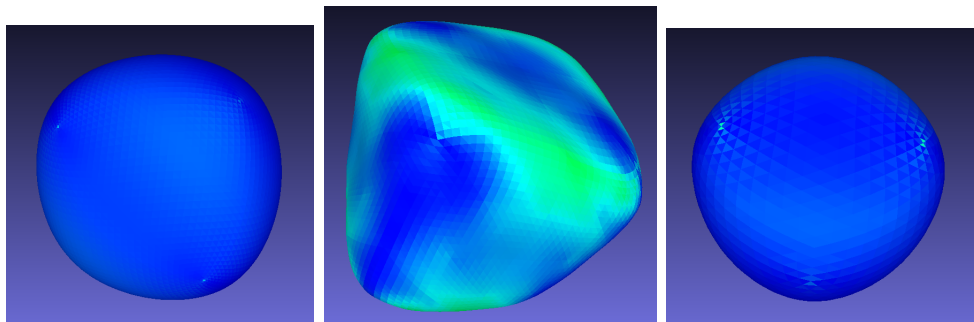
Color scale

- Control mesh **tetrahedron** after 5 steps



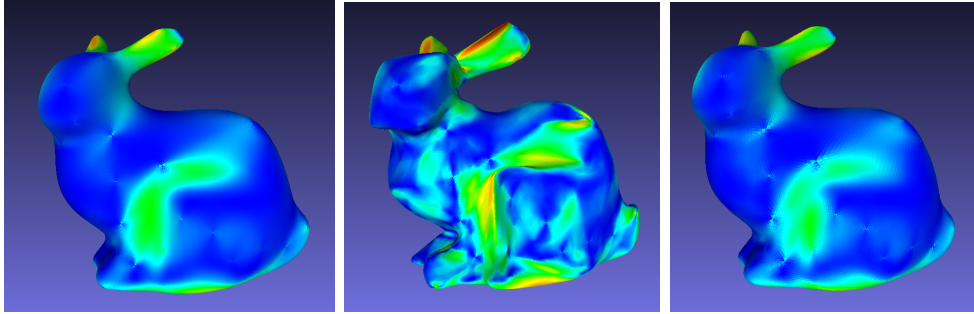
Loop; Modified Butterfly; Kobbelt

- Control mesh **cube** after 5 steps



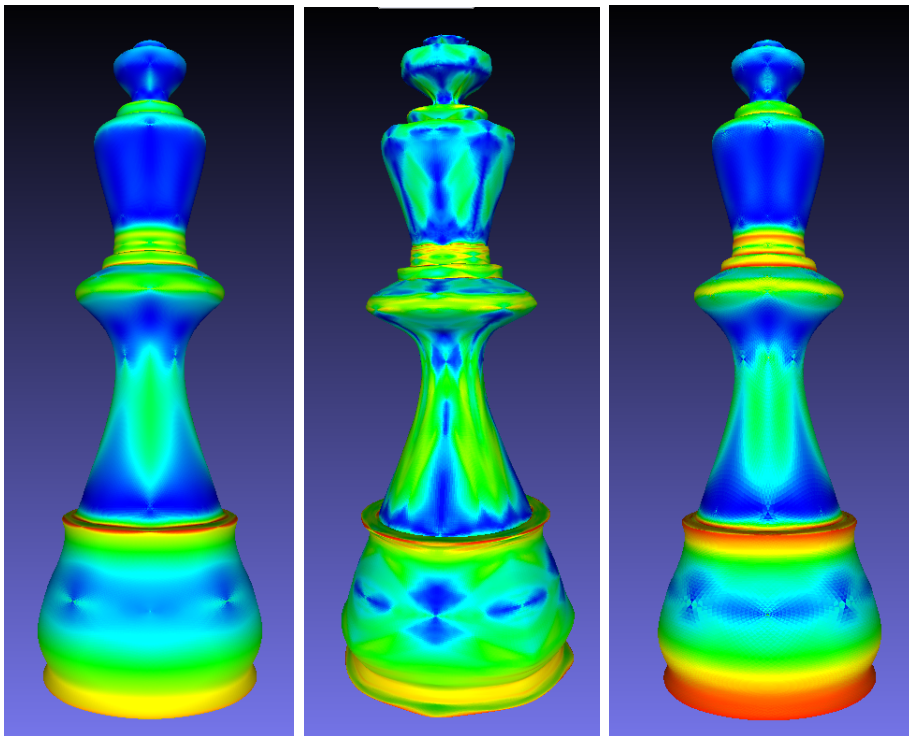
Loop; Modified Butterfly; Kobbelt

- Control mesh **bunny** after 5 steps



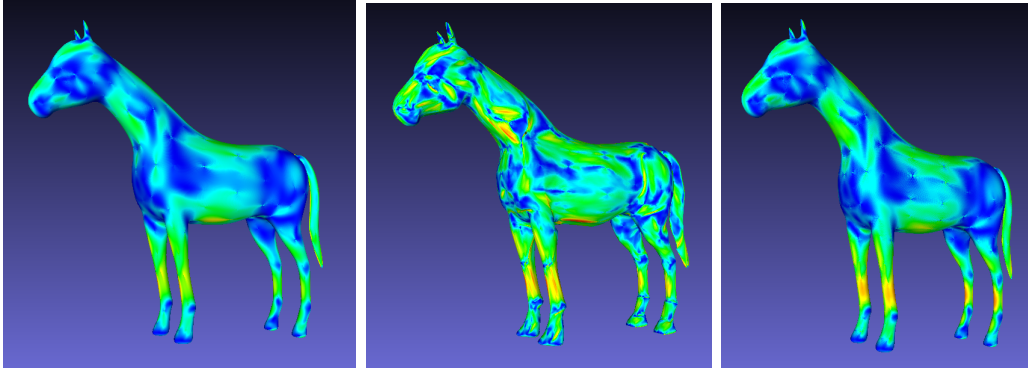
Loop; Modified Butterfly; Kobbelt

- Control mesh **king** after 5 steps



Loop; Modified Butterfly; Kobbelt

- Control mesh **horse** after 5 steps



Loop; Modified Butterfly; Kobbelt