OLM Open Tools
Noise Deformer
User Manual

OLM Digital, Inc.

Table of Contents

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Change Logs

2011/08/01   First Version
2017/11/02   Change License terms
2019/06/28   Fixed results produced with Along Normals

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1. Introduction

Noise Deformer is a deformer plug-in for Autodesk Maya. You can add noise to the shape of an object like shown in Figure 1. By changing the type of noise, the frequency or other parameters, you can create various shapes. You can also animate the created noise pattern.

The plug-in supports polygons, subdivision surfaces, NURBS surface and NURBS curves.
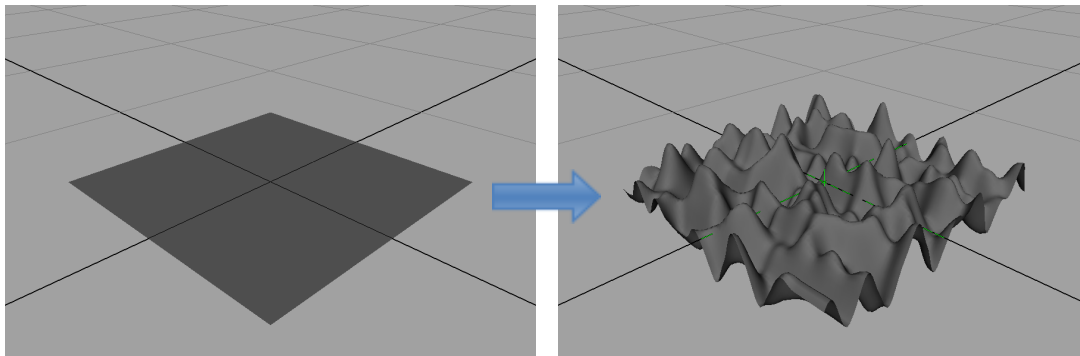
Figure 1：**Noise Deformer application example**

Other features:

- Control the noise influence with a bounding box
- Control the noise influence by weight painting
- Deform object using 2D/3D textures

1.1. Supported Environment

Please refer to OLM Open Tools website for a complete list of supported environment.

1.2. Install

The zip archive you can download from OLM Open Tools web site contains the files listed in Table 1. To install Noise Deformer, copy the plug-in file (OLMNoiseDeformer.mll/.so) in a directory from your MAYA_PLUG_IN_PATH (ex: Documents/maya/2022/plug-ins) and copy the script files in a directory from your MAYA_SCRIPTS_PATH (ex: Documents/maya/2022/scripts).

Folder	File Name	Explanation
plug-ins/[XXXX]/[32][64]/ windows	OLMNoiseDeformer.mll	The plug-in main file for Windows
plug-ins/[XXXX]/[32][64]/l inux	OLMNoiseDeformer.so	The plug-in main file for Linux
scripts/mel	AEnoiseDeformerTemplate.mel	MEL Script for the display in the Maya attributes editor.
doc	OLMNoiseDeformerUserManual .pdf	The user manual for Noise Deformer.

Table 1：**Content of the zip archive**

2. Using Noise Deformer
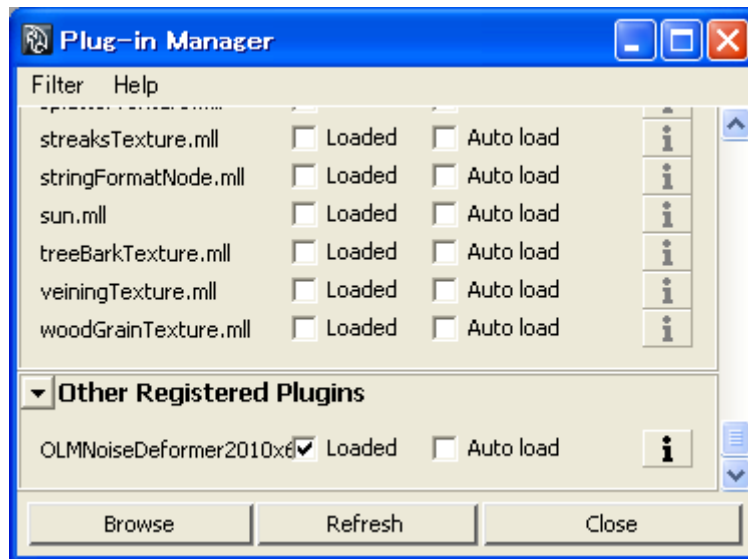
Figure 2：**Load the plug-in**

Before using Noise Deformer, you have to load "NoiseDeformer.mll" in the Maya Plug-in Manager. Select the object you want to deform and type the following command in the script prompt:

```
deformer -type noiseDeformer;
```

When you execute that command, the deformer is applied to the selected object and a locator is created to control the noise influence.

6

3. Parameters

You can change the appearance of the deformation by tuning parameters in the node attribute editor of Maya. Noise Deformer includes parameter to change noise type, the noise grain, the noise strength and the noise attenuation. There is also some parameter to animate the deformation, and you can tune the deformation by painting weight over your model.

3.1. Noise Type

The first parameters section in the attribute editor allows choosing noise global shape and type (see Figure 3).
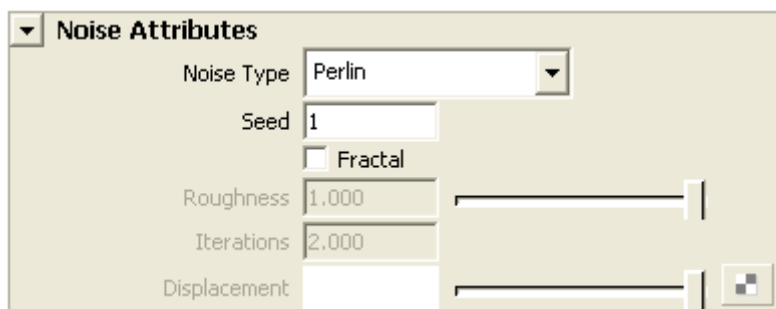
Figure 3：Parameters for Noise Type

You can choose among 5 different "Noise Type":

- Perlin Noise　　　　　　　:classical Perlin noise

- Absolute Value　　:absolute value of Perlin noise

- Sine　　　　　　　　　　:Perlin noise superposed on sine curves

- Sine Absolute Value　　:absolute value of Sine noise

- Texture Displacement　　:noise from a texture

We will explain now in more details, with some examples, each type of noise.
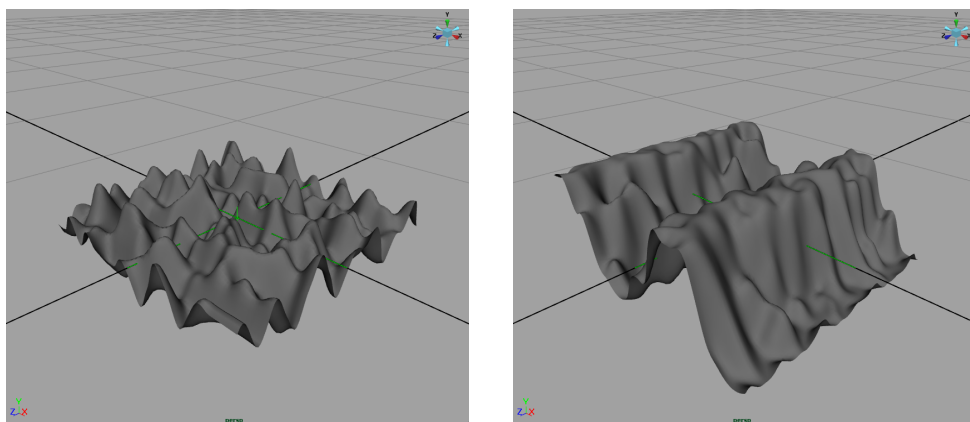
**Figure 4：Perlin Noise and Sine Noise examples**

Perlin Noise

When applying "Perlin Noise" you will get some irregular shape you can find in natural mountain landscape (Figure 4, left). You can adjust the level of detail of the noise.
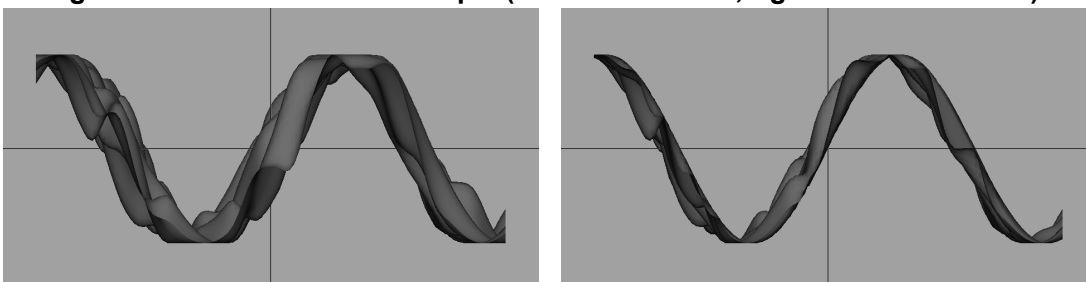
Sine

When applying "Sine" noise, "Perlin Noise" is combined with a global sine wave deformation (Figure 4, right). You can adjust the level of detail of the noise.

Absolute Value・Sine Absolute Value

In "Absolute Value" mode, the Perlin noise added to the deformation is always positive. Example is shown for simple "Perlin noise" (Figure 5), and for "Sine" noise (Figure 6)
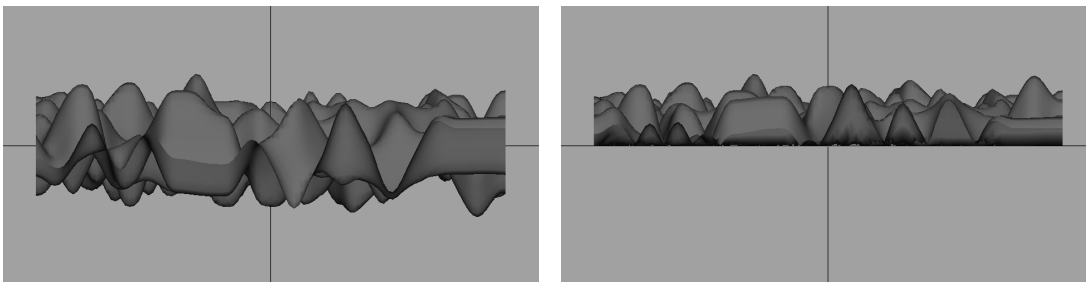

Figure 5 : Absolute Value example (left: Perlin Noise, right: Absolute Value)

Figure 6：Absolute value example (left: Sine, right: Sine Absolute Value)

Texture Displacement

When you choose "Texture Displacement" noise, the deformation is defined by the color of a texture. Then you can not change the level of detail of the deformation by changing deformer parameters. You have to adjust the texture node for that purpose.
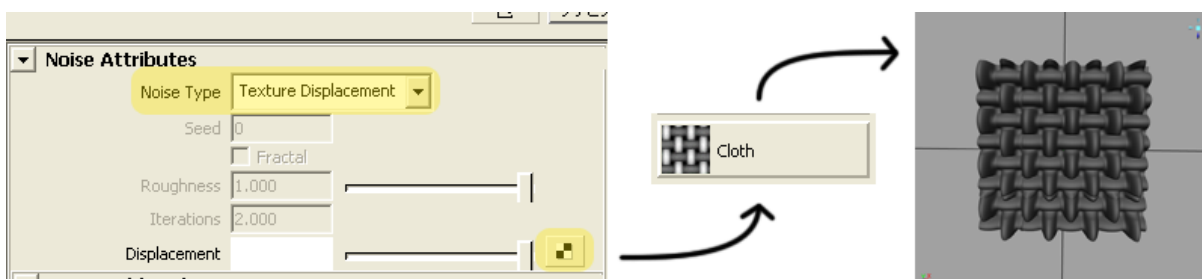
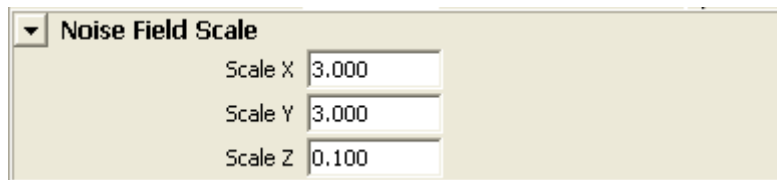**Figure 7：Example of "Texture Displacement" noise**

8

3.2. Noise Shape

Once you have chosen the type of noise you want to apply, you can adjust the deformation with the following parameters. Depending on the noise type, some parameter may have no effects.

- **Seed** – Random seed to generate the noise pattern. If you change the value similar noise will be generated. This parameter has no effect with "Texture Displacement" noise.
- **Fractal** – When on, adds some fractal noise. Basically adds small fractal like details to the base noise. This parameter has no effect with "Texture Displacement" noise.
- **Roughness** – Change the level of detail of the fractal noise. This parameter has no effect with "Texture Displacement" noise.
- **Iterations** – Change the number of iterations of the fractal noise. Bigger values generate more details. This parameter has no effect with "Texture Displacement" noise.
- **Displacement**
  This parameter is only valid with "Texture Displacement" noise. You can choose the texture to use to deform your shape. Maya 2D and 3D texture can be applied. An example with cloth texture is shown in Figure 7.

3.3. Noise Scale

Figure 8：**Parameters for noise scale**

The noise scale can be changed for all type of noise but "Texture Displacement". It adjusts the spatial scale of the noise field. As for the animation scale, refer to section 3.4.2.

- **Scale X, Y, Z** – Defines the size of the noise field along each base axis. Small scale value implies smaller field and the bigger density of variation, i.e. more details. Bigger values result in less detail and smoother deformations.

3.4. Noise Strength

**Figure 9: Parameters for noise strength**

9
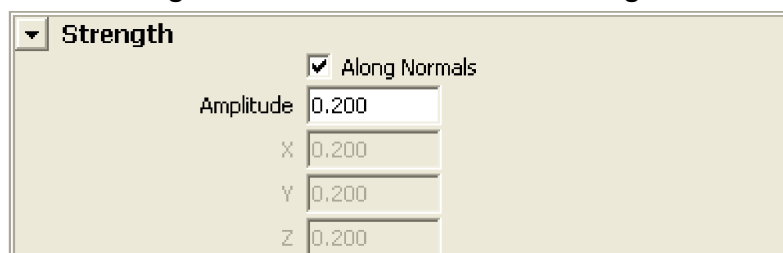
These parameters apply to all noise type and change the strength of noise.

- **Along Normals** – When on, the noise deformation is applied along the shape normal. When off, the direction of the deformation depends on the noise type.
- **Amplitude** – Defines the noise strength when noise is applied "Along Normals"
- **Amplitude X,Y,Z** – Defines the noise strength when noise is not applied "Along Normals". You can then define noise strength along each base axis X, Y, Z. Those base axes are not the world base axis. They are defined by the noise locator coordinate system.

10

3.4.1. Adjust Noise with Locator

When you create a Noise Deformer, a noise Locator is created at the same time. With this locator you can translate and rotate the noise field (see Figure 10).
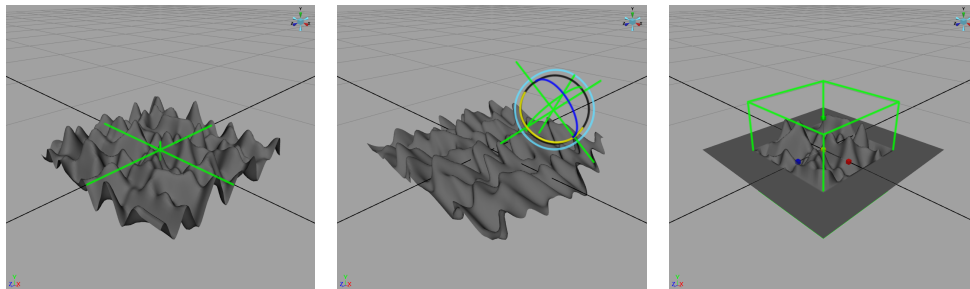

**Figure 10: Change of orientation, and noise influence range with locator
(Left: locator at origin, center: locator with translation/rotation,
right: locator with bounding box)**

By adding a bounding box to the locator, the noise influence range can be adjusted.
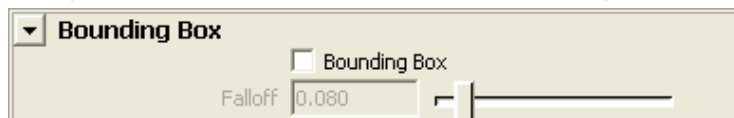
Figure 11: Parameters for noise influence range with bounding box

- **Bounding Box** – When on, the locator display change to a bounding box. Only object part inside the bounding box will be affected by the noise.(see Figure 10).
- **Falloff** – Valid only when using a bounding box to control noise influence. You can control the falloff of the deformation according to the distance from bounding box center (see Figure 12).
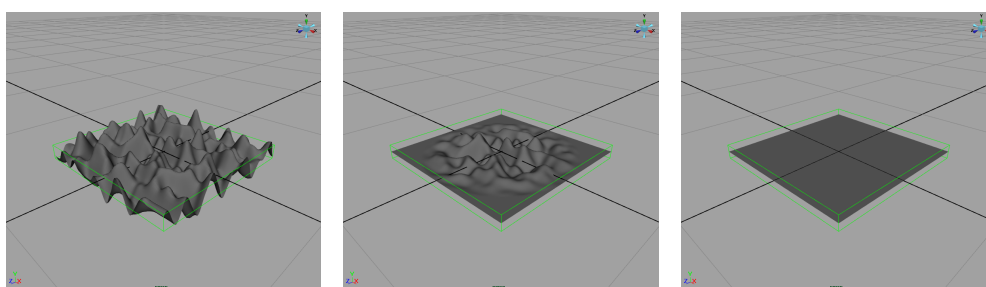
**Figure 12: Effect of Falloff parameter
(Left: Falloff=0.0, center: Falloff=0.5, right: Falloff=1.0)**

3.4.2. Noise Animation
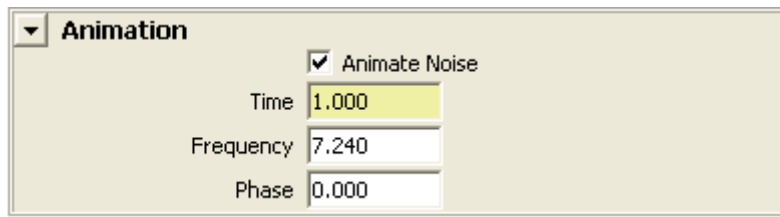
Figure 13: Parameters for noise animation

Except for "Texture Displacement", you can animate noise with Noise Deformer attribute.

- **Animate Noise** – When on, noise is animated with time
- **Time** －The value to define the noise shape time. By default, it is connected to time node
- **Frequency** – Defines the noise animation speed. Higher value implies faster motion
- **Phase** – Defines the offset on time dimension. For example with Frequency=1, a noise at Time=1 and Phase=4 is the same as a noise at Time=5 and with Phase=0

3.4.3. Painting Weight

Like with other deformer, you can use Maya paint attribute tool to control the strength of deformation. To enable the use of the weight execute the following MEL command:

```
makePaintable -attrType "multiFloat" -sm "deformer" "noiseDeformer" "weights";
```

Then select from Maya menu:"Modify>>Paint Attribute Tool". You can now use brush and edit the weight of the deformation. When the painted weight is 1.0, deformation is applied, when it is 0.0 no deformation is applied (see Figure 14)
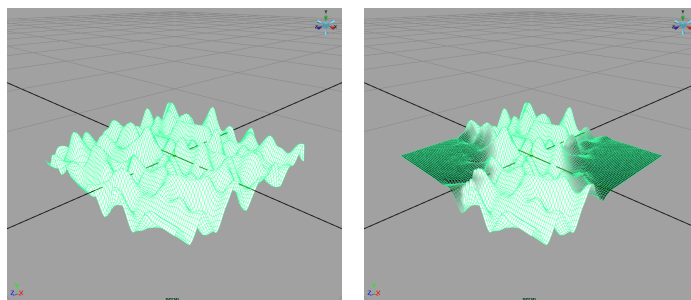
Figure 14: Example of weight editing
(Left: all weight=1.0, right: some weight=0.0)

4. Attention

More the point of the model, more memory is used and slower is the computation of the deformation. Depending on your computer, a large number of point may crash Maya.

5.   Others

If you have problem using the plug-in in any environment, if you find a bug, have a feature request, or for any kind of feedback feel free to contact us at the following mail address: opentools@olm.co.jp