`Jot` user manual

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by Robert D. Kalnins, Philip L. Davidson, and David M. Bourguignon

Here is the `Jot` user manual abstract.

Table of Contents

Chapter 1. Introduction

Jot is a program that lets designers, artists and animators to directly annotate 3D computer graphics models (and animation) for stylized (NPR) rendering. Jot currently implements many of the ideas described in the research papers WYSI-WYG NPR[1] and Coherent Stylized Silhouettes[2], and will soon include Suggestive Contours[3] as well. The long-range goals of the project are described here[4].

The Jot software is under development at Princeton University, in collaboration with researchers at Brown, Rutgers, and the University of Michigan. The implementation is intended as a research prototype, not commercial software, so it comes with the usual caveats: we know it has bugs, the UI is not well-designed, and so forth. Nonetheless, if you encounter obvious bugs, please send email to `<jot-bugs@cs.princeton.edu>`. For other concerns, such as problems with these web pages, send mail to `<jot-admin@cs.princeton.edu>`.

Our current release runs on PC/Windows only, though we anticipate a release on LINUX soon and Mac OS-X after that. We are currently releasing software executables only, but intend to make source code available in the long run.

Made with DocBook[5]!

Notes

1. http://www.cs.princeton.edu/gfx/proj/wnpr
2. http://www.cs.princeton.edu/gfx/proj/css
3. http://www.cs.princeton.edu/gfx/proj/sc
4. http://www.cs.princeton.edu/gfx/proj/3Dcontent
5. http://opensource.bureau-cornavin.com/crash-course/index.html

Chapter 2. License Information

License info coming soon.

Chapter 3. Tutorials

We present below two tutorials of increasing complexity to describe `Jot` work flow.
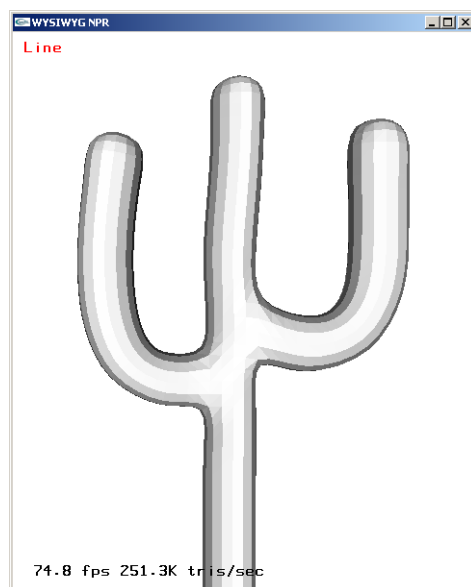
Basic Tutorial

Drawing the Cactus Picture!
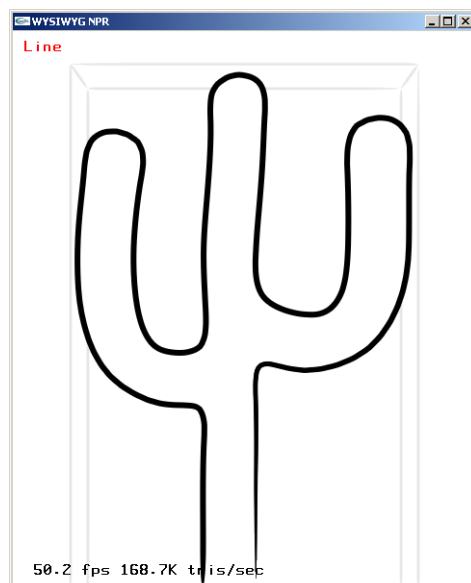
In this tutorial, we will create a picture of a cactus.

1. Loading the cactus model in flat rendering.

```
C:\ cd JOT_ROOT
C:\ cd manual\tutorials\tutorial-1
C:\ jotq cactus-1.jot
```


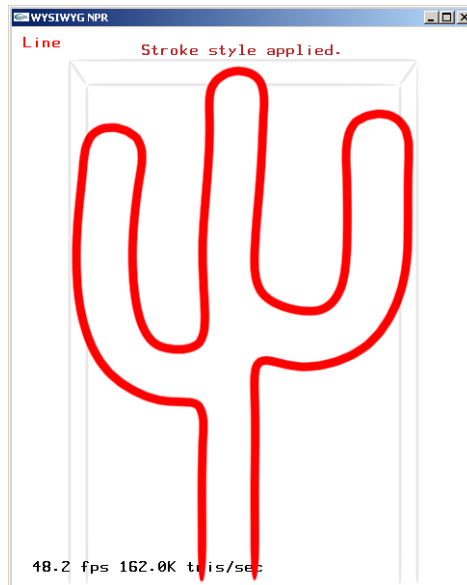The 3D geometric model of the cactus, in flat shading.

2. Rendering the model in default NPR renderer (black silhouettes and no fill).
Click with left mouse button on the model.

The 3D geometric model of the cactus, with default NPR rendering.
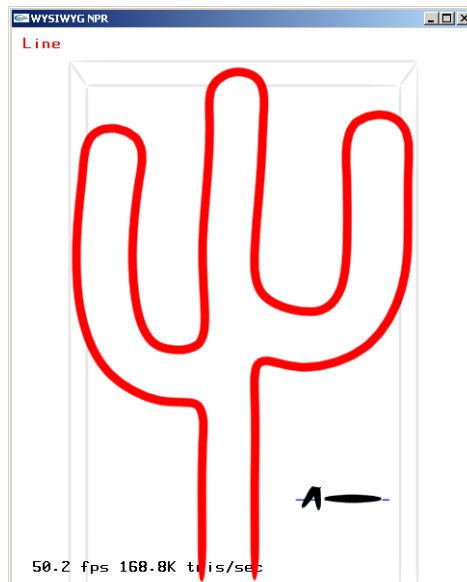
3. Editing the silhouette

   a. Select the silhouette by clicking on it with left mouse button. The silhouette turns red.
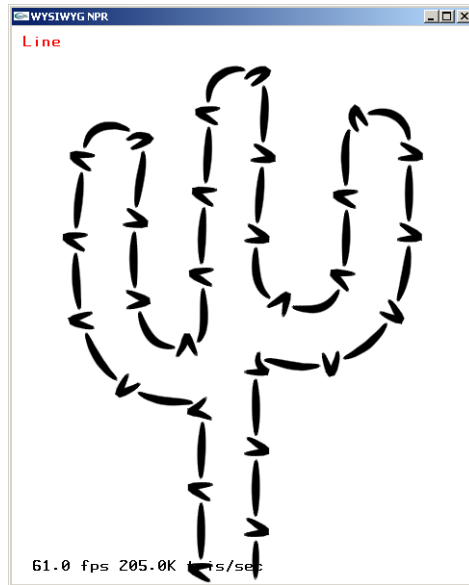

   Cactus model with selected silhouette.

   b. Adjust stroke width with the slider: **NPR Stroke Editor**⟶Stroke Shape/Appearance

   c. Adjust stroke flare to zero: **NPR Stroke Editor**⟶Style

   d. Apply change permanently: **NPR Stroke Editor**⟶Style and press **Apply Current**.

4. Sketching the silhouette offset pattern.

   a. With the silhouette selected, sketch the silhouette offset pattern, such as the one on the lower right of the figure, using the left mouse button.

   Cactus model with modified silhouette and offset pattern.

   b. Apply offset pattern to the strokes: **NPR Stroke Editor**⟶Stylization and press **Apply Sketch**.

Cactus model with modified silhouette with offset pattern.

5. Setting the basecoat

    a. Switch to basecoat editing mode. Click on **Previous Mode** to enter **Basecoat mode**. Click on the model to select it again.
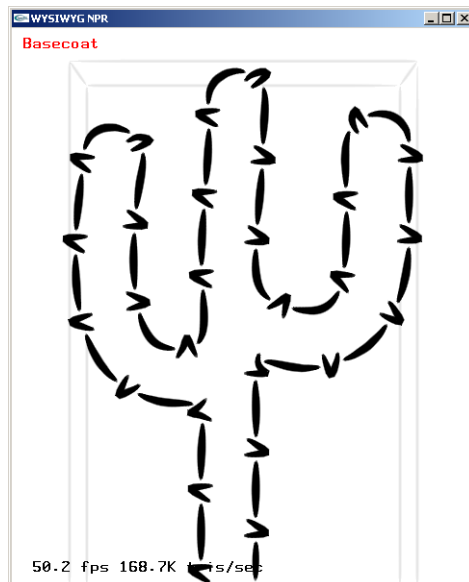
Cactus model selected.

    b. Add a normal shader: **Base Coat Editor**⟶Base Coat⟶Layer Editor. Select **Norm** and press **Add**. Adjust hue (0.3), saturation (0.5), value (0.6).

Cactus model with normal shader.

c. Add a toon shader: **Base Coat Editor**⟶Base Coat⟶Layer Editor. Select **Toon** and press **Add**.
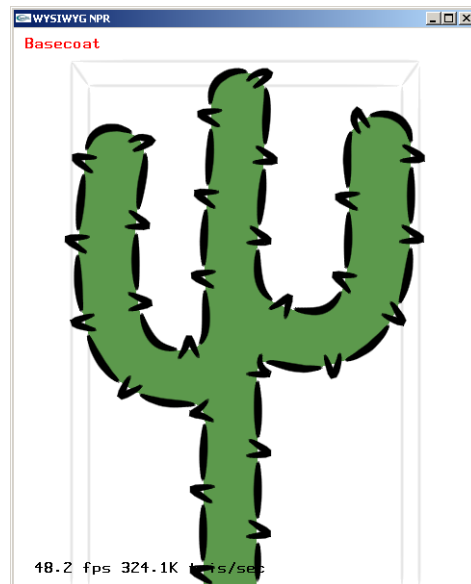
Select `alpha_thin.png` texture: **Base Coat Editor**⟶Base Coat⟶Texture and adjust alpha (0.5): **Base Coat Editor**⟶Base Coat⟶Alpha.
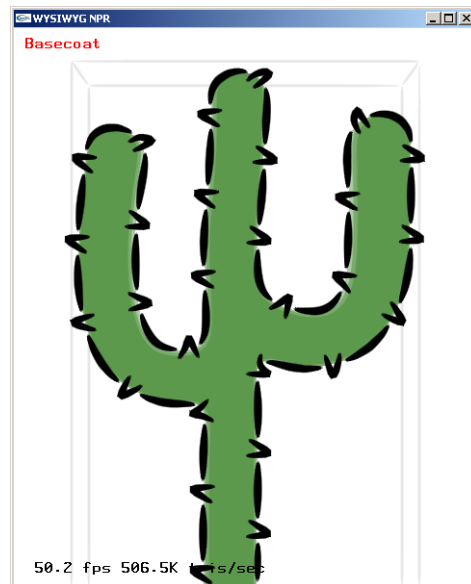
Cactus model with toon shader.

d. Adjust lighting: **Base Coat Editor**⟶Base Coat⟶Toon Lighting. Select custom light **L?** and adjust lighting direction with **Dir/Pos**.
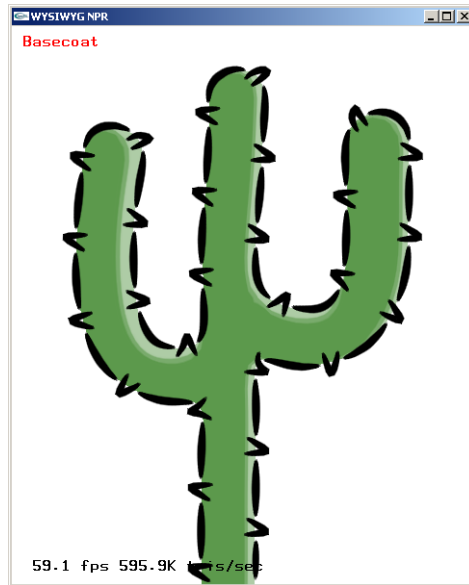
Cactus model with lighting.

6. Done!
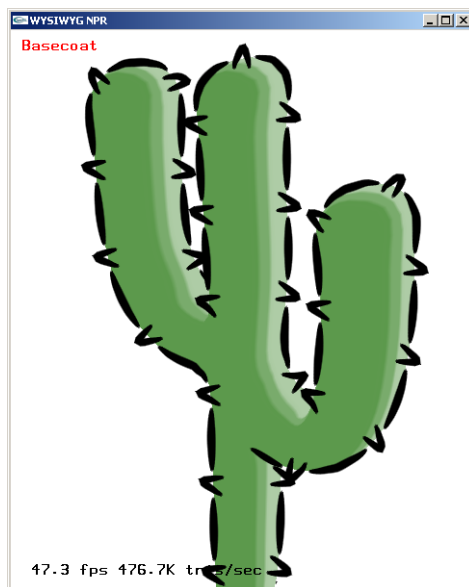
Cactus model completed.

Intermediate Tutorial

Drawing the Mechanical Part Picture!

In this tutorial, we will create a picture of a mechanical part.

1. Loading the model in flat rendering.

```
C:\ cd JOT_ROOT
C:\ cd manual\tutorials\tutorial-2
C:\ jotq mechanical-1.jot
```
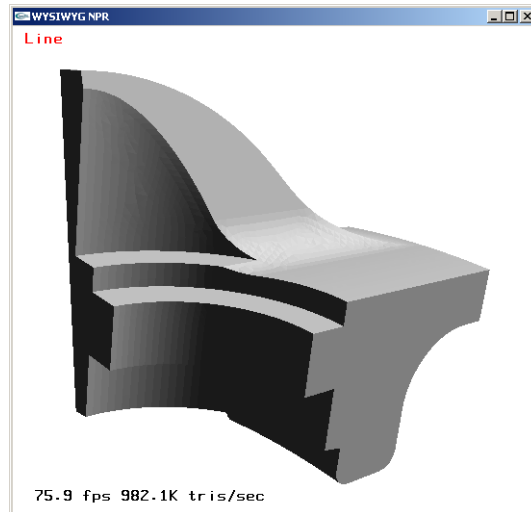
The 3D geometric model of the mechanical part, in flat shading.

2. Setting the background

   a. while in the the WYSIWYG NPR window, press **v** for bringing up **Global Parameters**

   b. Adjust color: **Global Parameters**⟶Background. Adjust hue (0.65), saturation (0.12), value (0.9), alpha (0.9). Check box **Apply Paper to Bkg**.

   c. Adjust paper: **Global Parameters**⟶Paper. Check box **Active**. Select `p-cement-6.png` in paper in **Texture**. Adjust brightness (0.6), contrast (0.3).
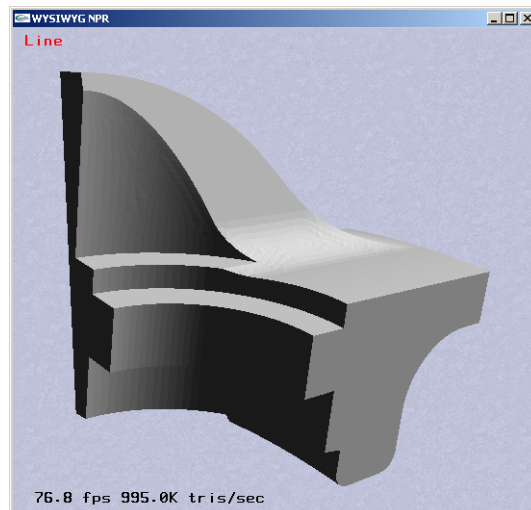
Mechanical part model with background.

Type **v** again to hide the **Global Parameters** window.

3. Setting the basecoat

   a. Switch to basecoat editing mode. Click on **Previous Mode** to enter **Basecoat mode**. Click on the model to select it again.
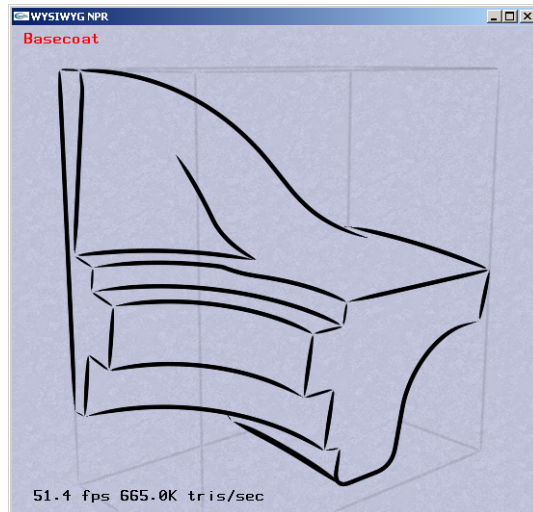
Mechanical part model selected.

b. Add a toon shader: **Base Coat Editor**⟶Base Coat⟶Layer Editor. Select **Toon** and press **Add**.

Select `alpha_thin.png` texture: **Base Coat Editor**⟶Base Coat⟶Texture and adjust alpha (0.5): **Base Coat Editor**⟶Base Coat⟶Alpha.

Select **Apply Paper Effect**.
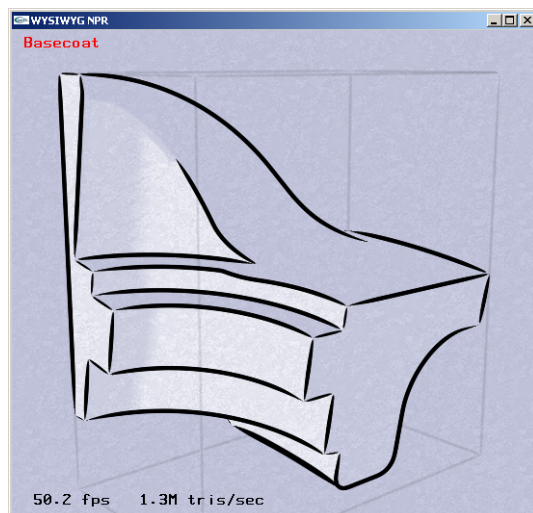
Mechanical part model with toon shader.

c. Adjust lighting: **Base Coat Editor**⟶Base Coat⟶Toon Lighting.

Select custom light **L?** and adjust lighting direction with **Dir/Pos**.
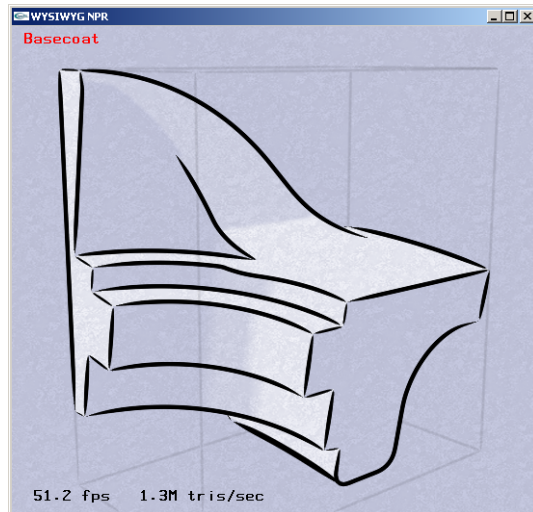
Mechanical part model with lighting.

4. Stylizing visible lines

   a. Switch to line editing mode. Click on **Next Mode** to enter **Line mode**. Click on a visible crease line (CRE_VIS) to select it.
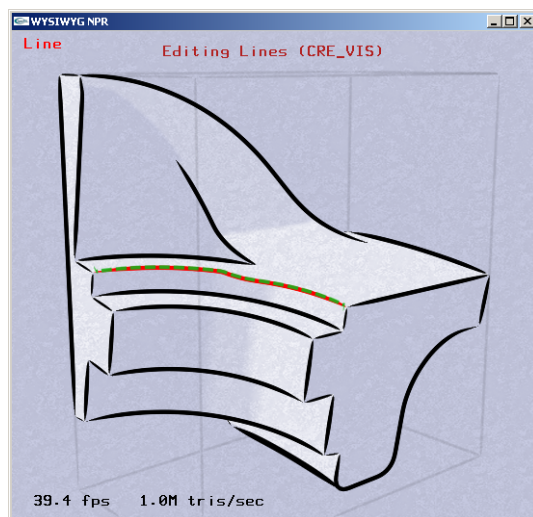
Mechanical part model with line selected.

   b. Select a preset line style: **NPR Stroke Editor**⟶Stroke Editor⟶Presets. Select preset `mech-solid`.

   Apply change permanently: **NPR Stroke Editor**⟶Line Plug-in Controls⟶Stylization⟶Style. Select **Apply Current**.
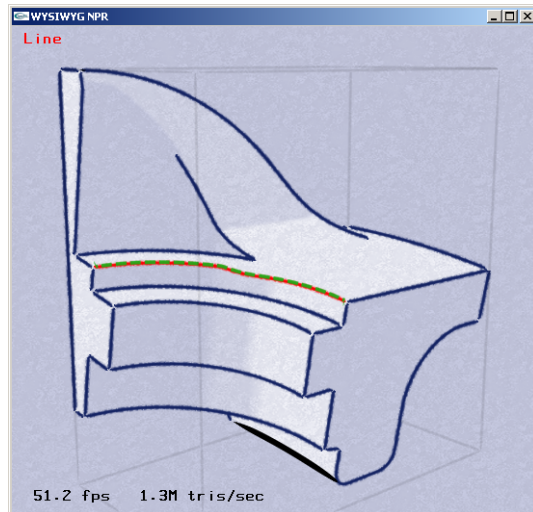
Mechanical part model with new crease line style.

c. Apply the same active style to silhouette lines: Select a silhouette line (SIL_VIS). Apply change permanently: **NPR Stroke Editor**⟶Line Plug-in Controls⟶Stylization⟶Style. Select **Apply Current**.
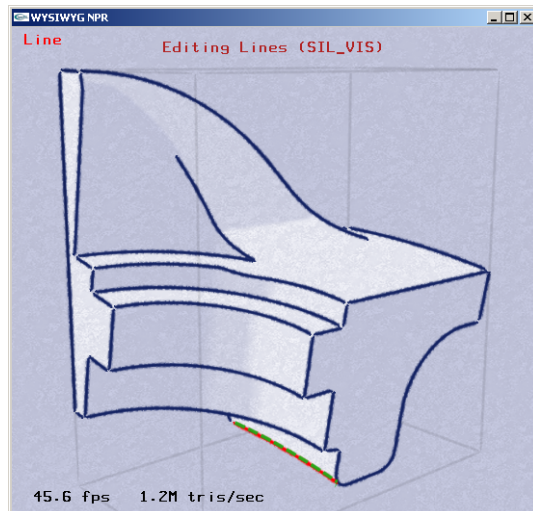
Mechanical part model with new silhouette line style.

5. Stylizing hidden lines

a. Enable hidden lines: **NPR Stroke Editor**⟶Line Plug-in Controls⟶Line Types. Select **See Thru**, **Sil-Hid** and **Cre-Hid**.

Mechanical part model with hidden lines in default style.

b. Apply style to hidden crease lines: Select a hidden crease line (CRE_HID).
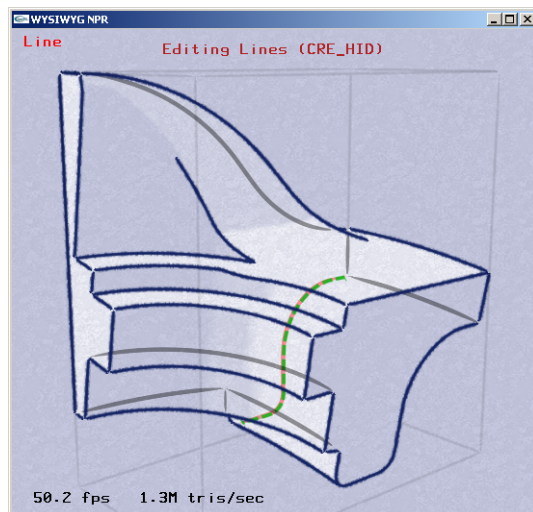
Mechanical part model with selected hidden crease line.

Select a preset line style: **NPR Stroke Editor**⟶Stroke Editor⟶Presets. Select preset `mech-light`.

Adjust period of 2D texture: **NPR Stroke Editor**⟶Stroke Editor⟶Stroke Color/Texture. Adjust **Period** to 20 pixels (use **arrow keys** for fine adjustment).

Apply change permanently: **NPR Stroke Editor**⟶Line Plug-in Controls⟶Stylization⟶Style. Select **Apply Current**.
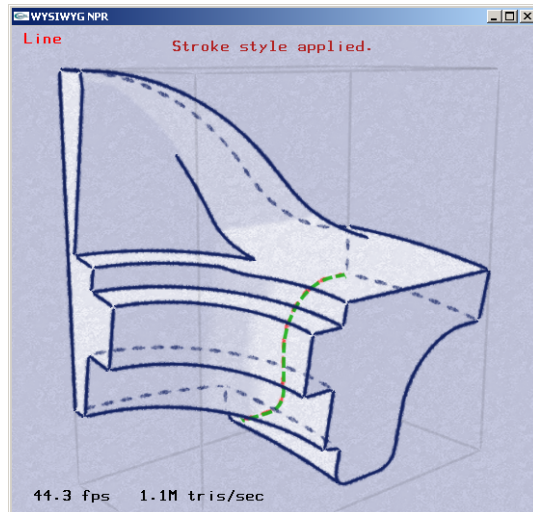
Mechanical part model with hidden crease line style.

c. Apply style to hidden silhouette lines: Manipulate the camera to reveal a hidden silhouette line (SIL_HID). (Learn about camera manipulation). Select it.
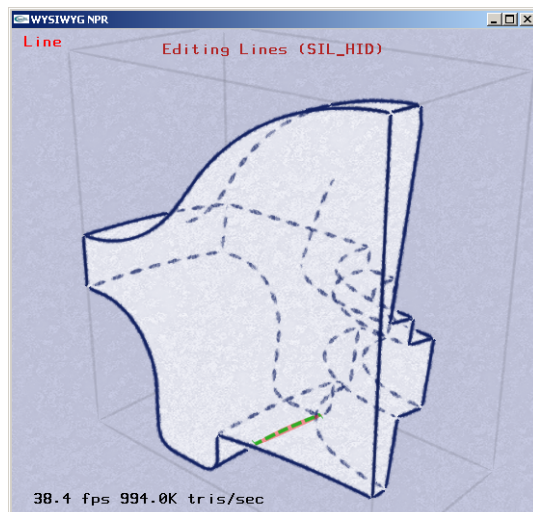
Mechanical part model with selected hidden silhouette line.

Apply the same active style to hidden silhouette lines: Apply change permanently: **NPR Stroke Editor**⟶Line Plug-in Controls⟶Stylization⟶Style. Select **Apply Current**.

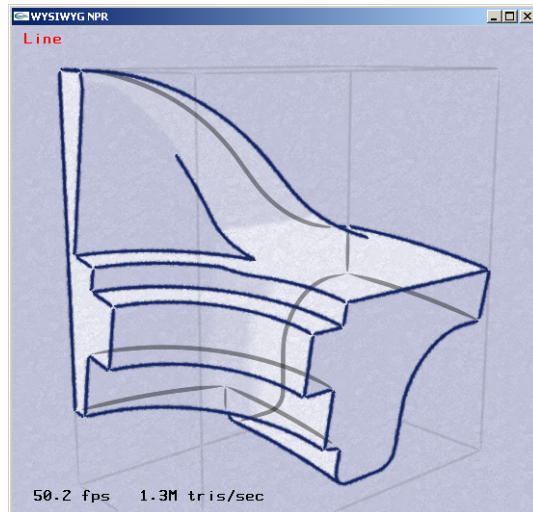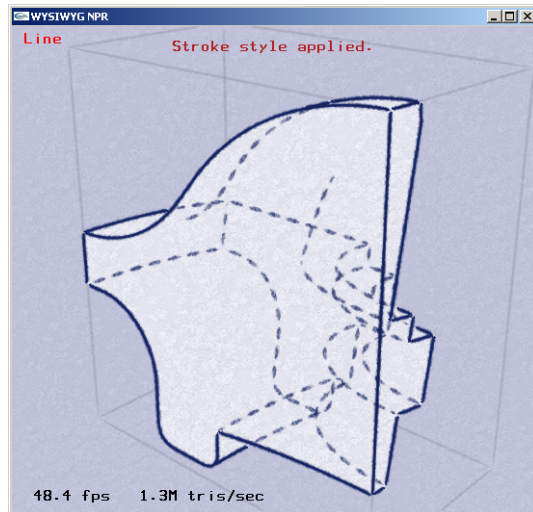Mechanical part model with new hidden silhouette line style.

6. Done!
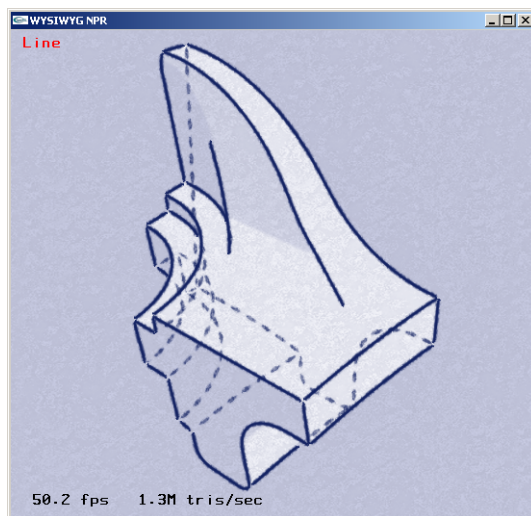
Mechanical part model completed.

Advanced Tutorial

This tutorial will include Hatching Editing Mode.

Animation Tutorial

Dances with Cactii

In this tutorial, we will export from Lightwave an animated scene and then import the result to Jot.

1. Load the lightwave scene in Ligthwave.

```
C:\ cd JOT_ROOT
C:\ cd manual\tutorials\tutorial-4\lw_files
C:\ lightwav.exe cactus_dancing.lws
```

2. Manually indicate to Lightwave the location of object file:
   manual\tutorials\tutorial-4\lw_files\cactus_dancing.lwo.
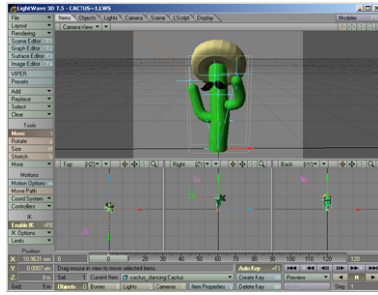
Cactus model loaded in Lightwave.

3. If this is the first time you are exporting from Lightwave to Jot, load the Jot Export plugin

    a. In the Layout menu, select Plug-ins > Add Plug-in

    b. Navigate to the file "Jot Export.p", located in `scripts\lw2jot.p`. Click "Ok".

    c. Click "Ok" in the Information dialog.

4. Start the Jot Export plug-in, from the Layout > Plugins > Generic menu.
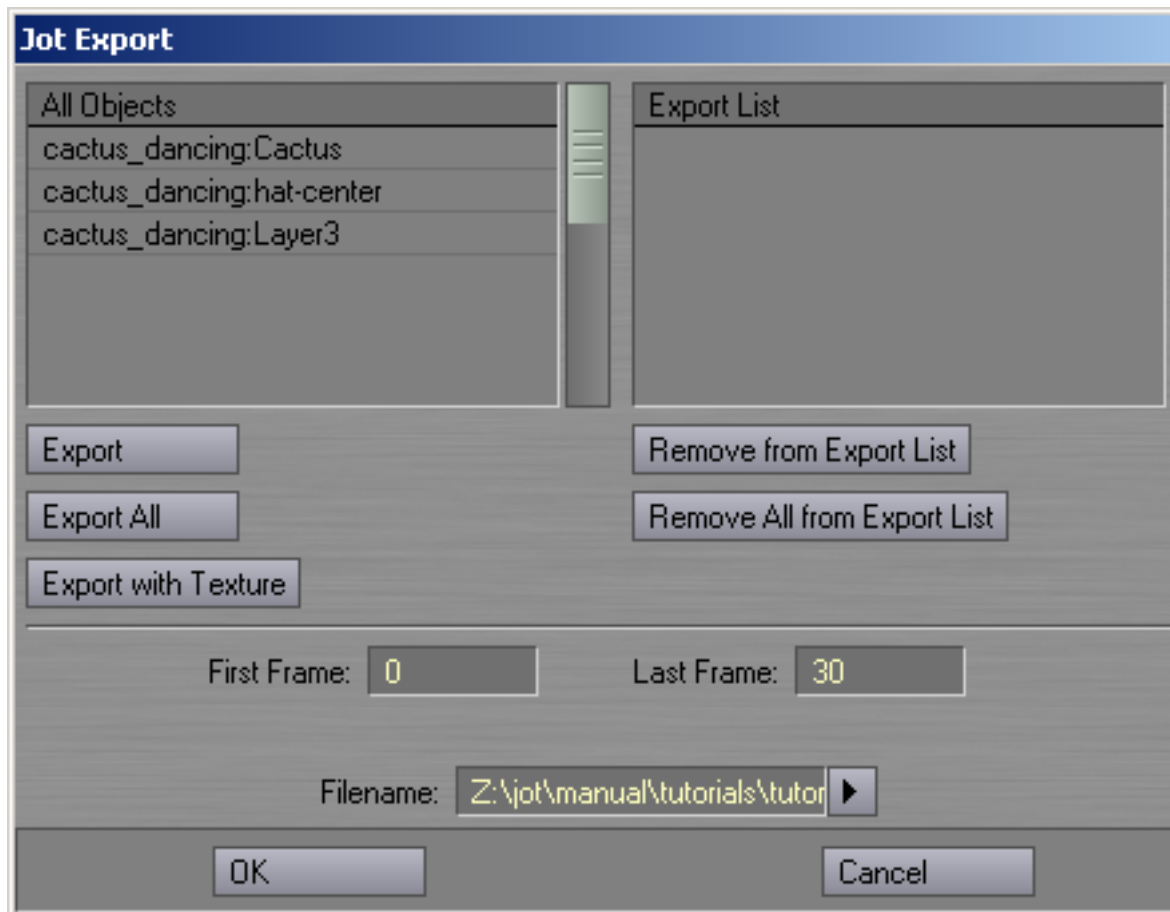
Lightwave GUI.

5. The left-hand list ("All Objects") shows a list of objects in the scene, and, if the object is textured, the number of textures on that object.

    a. To export geometry but not texture information:

        i. Select the object you wish to export from the "All Objects" list. Click **Export**. This will move the object you have selected from

the "All Objects" list to the "Export List", and will disregard
any textures belonging to that object.
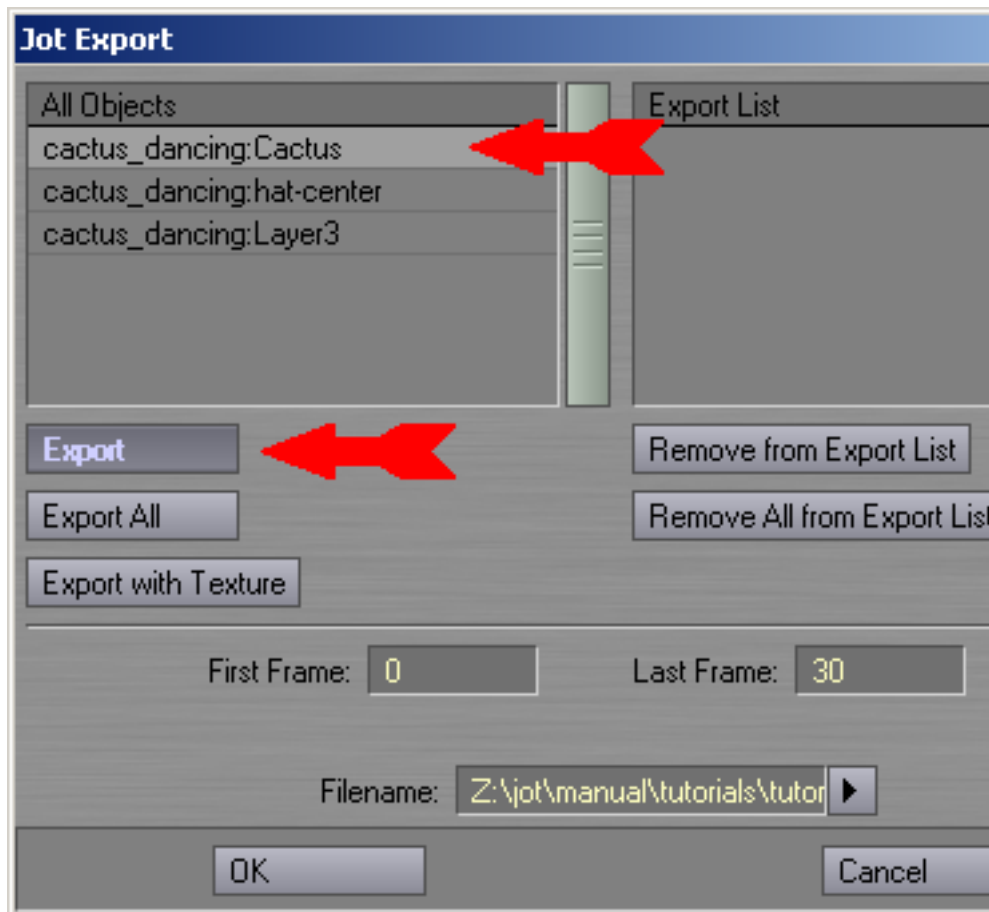
Lightwave GUI.
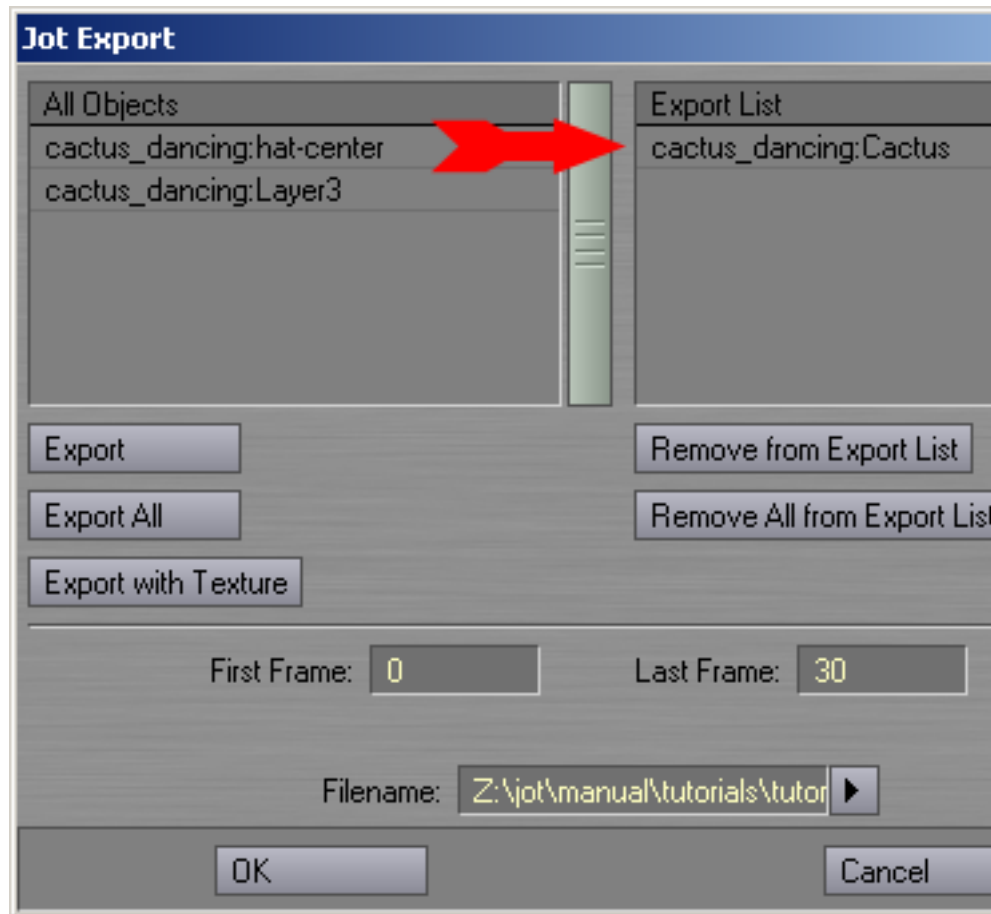
Lightwave GUI.

ii. Alternately, to export all objects (without texture information), click **Export All**. This will move all objects in the "All Objects" list to the "Export List", and will disregard any textures belonging to these objects. Objects already exported with textures will remain unchanged.
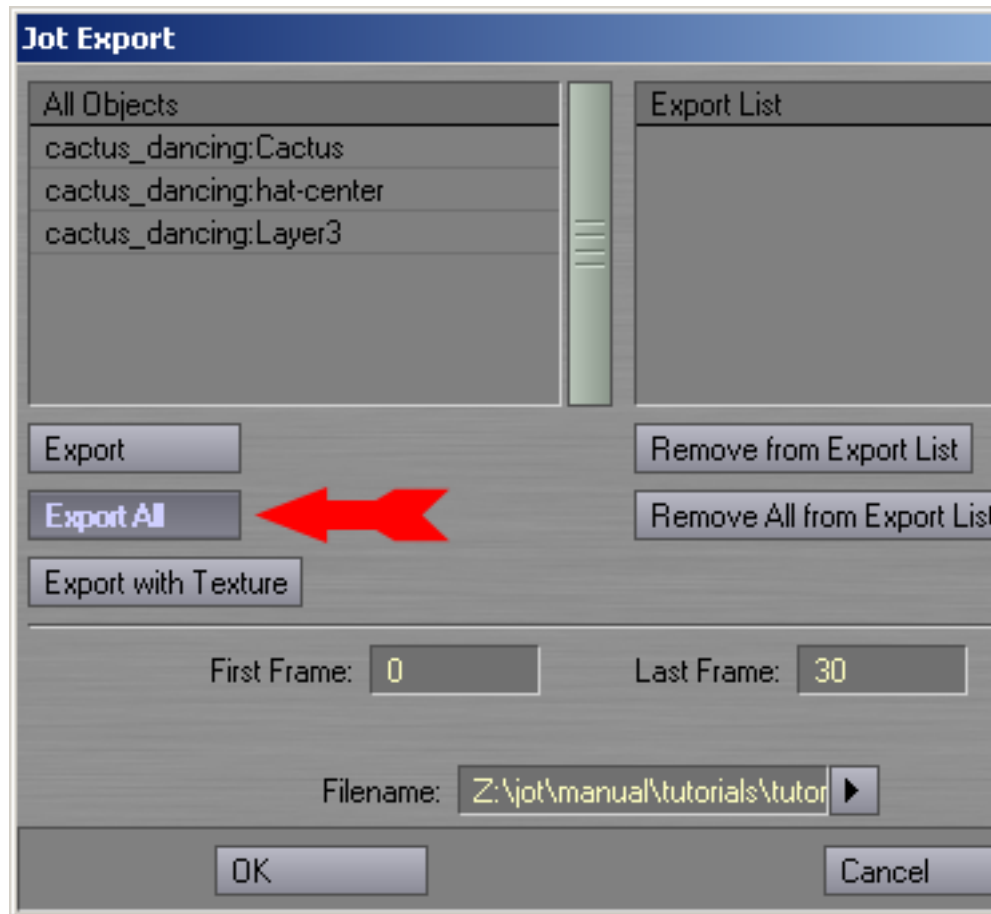
Lightwave GUI.

b. To export geometry with texture information:

    i.   Select the object you wish to export from the "All Objects" list (it must be an object with at least one texture). Click the **Export with Texture** button.
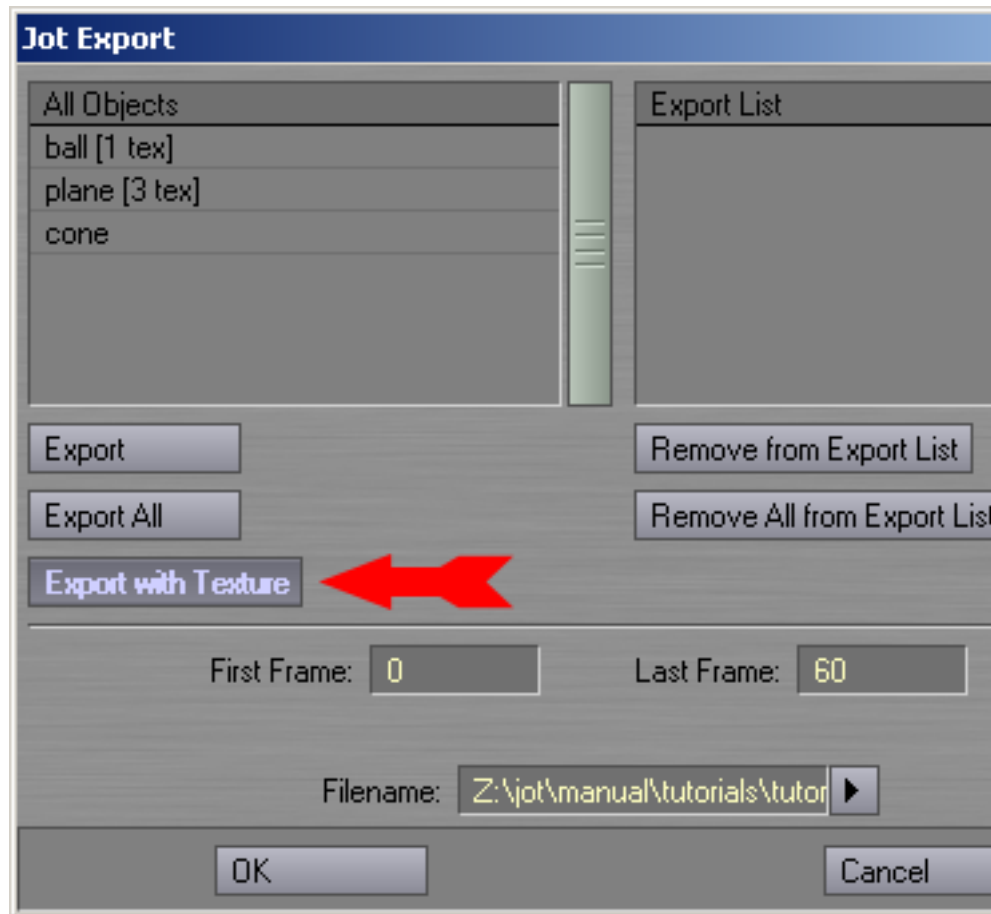
Lightwave GUI.

ii. If the object has more than one texture, you must choose one to be exported with the object from the dialog box that appears.
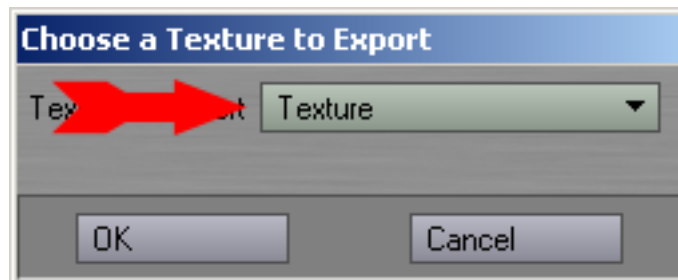
Lightwave GUI.

The object now appears in the "Export List", with "+ tex" after it to indicate that this object is being exported with texture coordinates.

6. Enter the starting frame in the **First Frame** field, and the final frame in the **Last Frame** field. The scene will be exported including both the first and last frames.
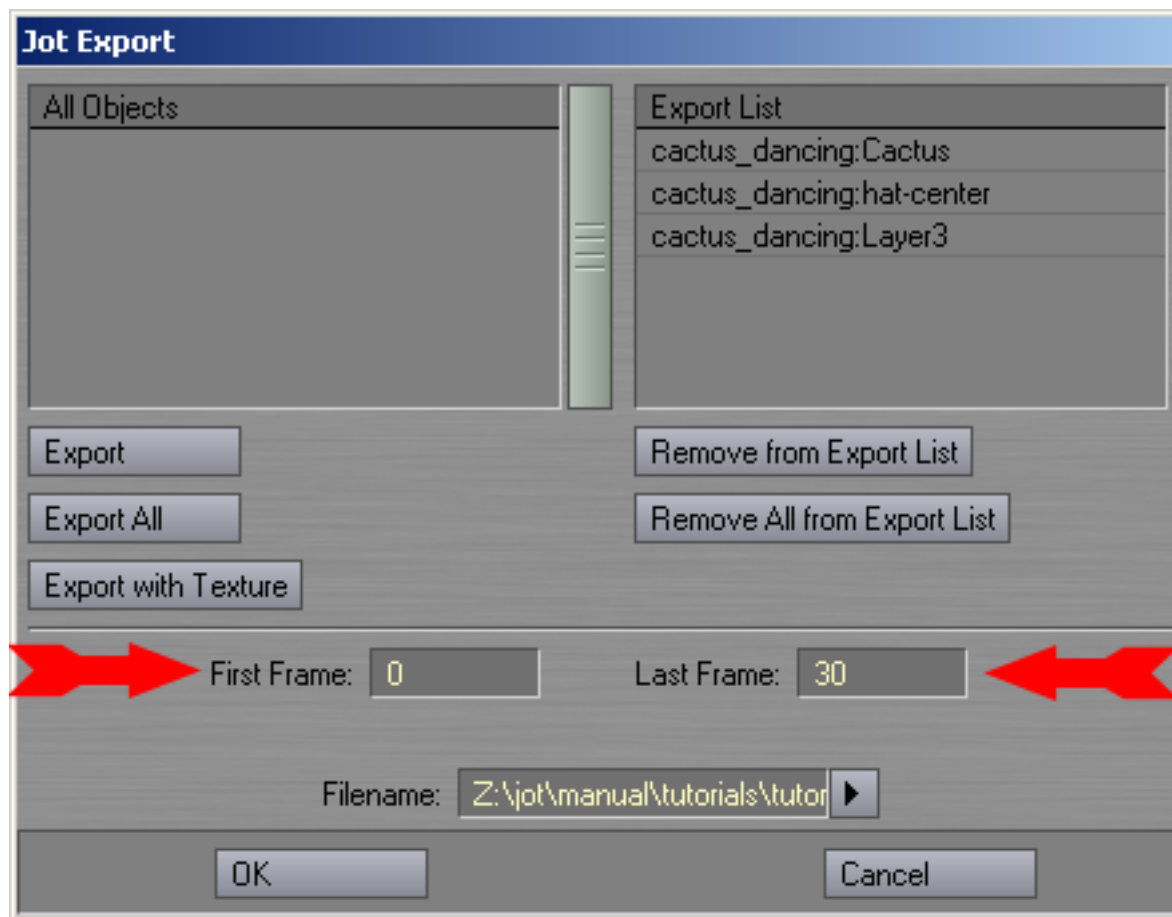
Lightwave GUI.

7. Enter a filename to save the exported scene as. The extension of the file will be changed to ".jot" regardless of what extension is entered here. Additionally, potentially many other files will be created during the export, so you may want to create a directory to save the exported files in.
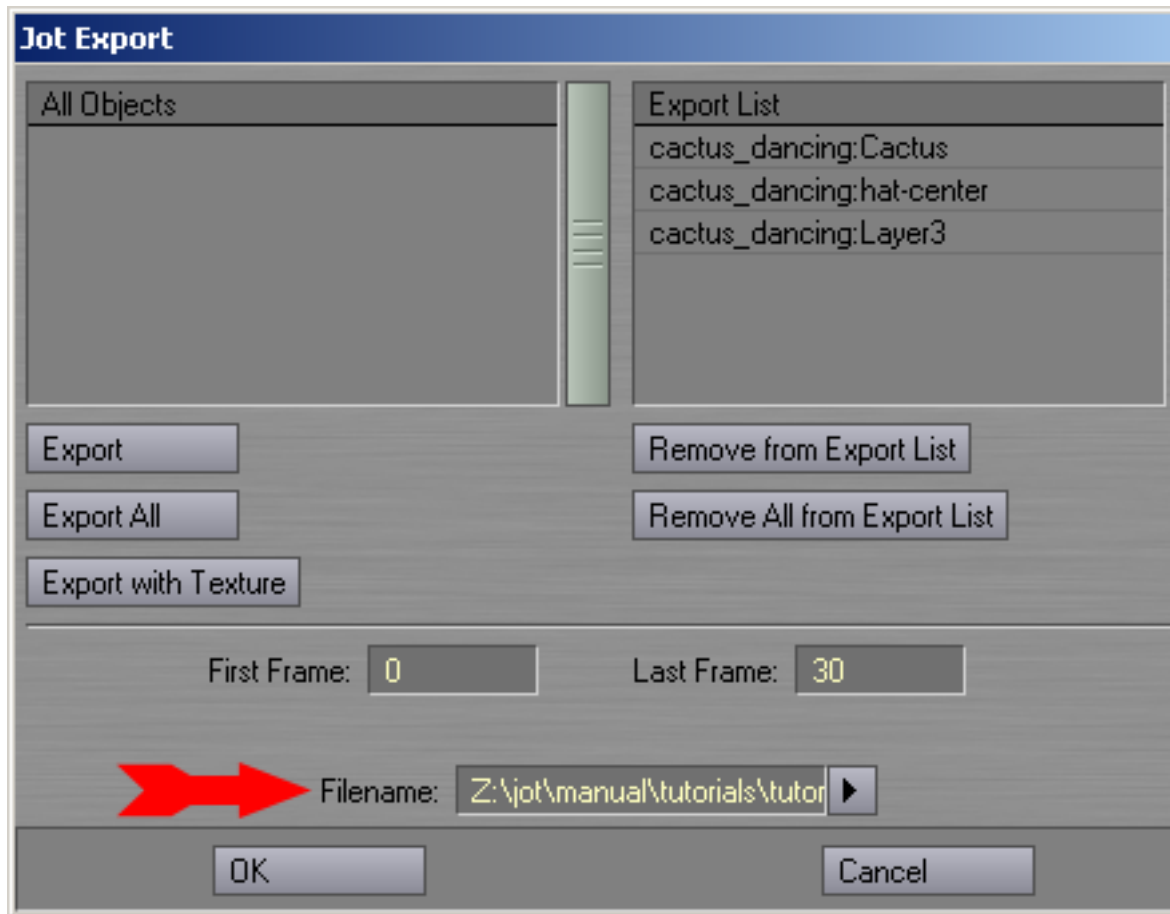
Lightwave GUI.

8. Click "Ok". The frame slider will move from the first frame to the last frame you entered, and you will see your scene animated as it is exporting. A dialog box will alert you to the end of the export process.

9. Now import the exported files in directory `manual\tutorials\tutorial-4\jot_files` into `Jot`. (A copy of the files which should have exported into the directory `manual\tutorials\tutorial-4\jot_files` is provided in `manual\tutorials\tutorial-4\jot_files.bak`.)

```
C:\ cd JOT_ROOT
C:\ cd manual\tutorials\tutorial-4\jot_files
C:\ jotq cactus_export.jot
```
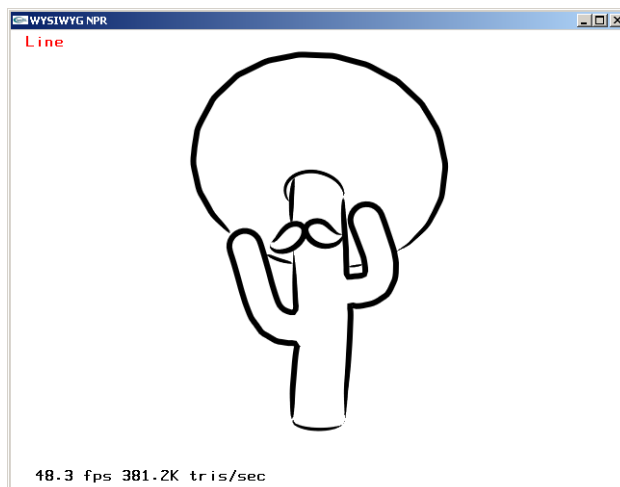

Cactus model with default style.

10. The various components of the cactus can be stylized using the techniques demonstrated in the previous tutorials. You may stylized this cactus and save the result by pressing **s**. However, `manual\tutorials\tutorial-4\jot_files.npr` contains another copy of the exported files which already have been stylized.

```
C:\ cd JOT_ROOT
C:\ cd manual\tutorials\tutorial-4\jot_files.npr
C:\ jotq cactus_export.jot
```


Cactus model with npr style.

11. To access the other frames of the animation, engage Animator Mode by pressing **X**. (WYSIWYG NPR rendering window must have focus to receive keystroke commands.)
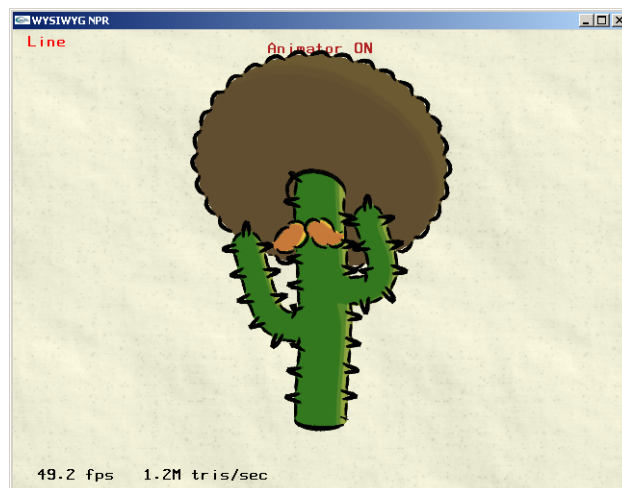
Cactus model with Animator Mode ON.

12. Step through the frames using the numeric keypad: **4** and **6** step backward and forward by one frame; **2** and **8** step backward and forward by ten frames; **5** returns to the first frame.

Stepping through the frames of the cactus animation.

13. To play back the entire animation, press **/**. Press **+** to stop. (Each frame is loaded from disk, so playback is slooow. Don't ask...)

Playing the cactus animation.

14. To render frames to disk, engage time sync with **-** and render mode with *****.
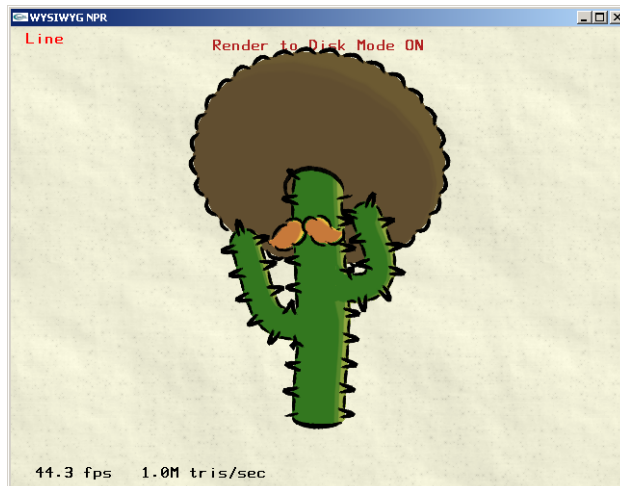
Engaging render to disk mode.

15. Pressing **/** now with render to disk mode on will play back the frames and render them to disk. (A DivX movie file of these frames is provided: `manual\tutorials\tutorial-4\jot_files.npr\cactus_export.avi`).

Frames are rippen to disk.

Chapter 4. Reference guide

Camera Manipulation

Mouse

Left button: Model Interaction

The left button is used for selection and stylization of the scene. This specific behavior depends upon the current mode.

In general, click once on an object to select it

> Object attributes can now be edited.

In general, hold the button down and move to draw

> The lines you draw affect stylization.

Right button: Navigation

> In all modes, the right mouse button is used for camera manipulation.

Click in the center of the window and drag with horizontal motion

> Translation parallel to image plane.

Click in the center of the window and drag with vertical motion

> Translation perpendicular to image plane ("zooming").

Click near the border of the window and drag

> Rotation.

Click anywhere and release, then drag

> Define a center of rotation (blue sphere) and use it.

Double click on the model

> Define a point on the model surface and position it at the center of the window.

Tablet

TODO.

Editing Mode - Overview

At any given time, `Jot` is in one of three Editing Modes. The current is indicated in the upper left of the rendering window. In each different mode the left mouse button, some key strokes, and the GUI window behave differently.

We describe in the following sections the three Editing Modes. The first concerns line editing (e.g. silhouettes and creases), the second hatching editing, the third basecoat editing (i.e. shaders for the triangle meshes).

Editing Mode - Line Editing Mode

In this mode, various lines types arising from the geometry (e.g. silhouettes, creases) or sketched unto mesh surfaces by the user (e.g. decals) can be selected and stylized. Stylization controls described in this section include appearance parameters (e.g. width, color), path parameters (e.g. directly oversketched wiggles), and temporal parameters (e.g. frame-to-frame coherence behavior and stroke animation).

Mouse

In general, the left mouse button is used to select line entities (e.g. decals, silhouettes) to be stylized, and then sketch their associated stylization. If a mesh, or existing decal is left-clicked, then decal editing mode is entered as indicated at the top of the rendering window and in the status field of the GUI. The selected mesh will be indicated by showing a bounding box, and any selected decal will be highlighted. Sketching in decal mode serves to define additional decals.

If any other line type (i.e. silhouette, crease, border) is selected, then line editing mode is entered as indicated at the top of the rendering window and in the status field of the GUI. The selected mesh will be indicated by showing a bounding box, and selected line will be highlighted. Sketching in line mode serves to define offset-based stylization for the selected line type.

Clicking on the background or another entity will deselect the current entity. If stroke style changes in the GUI, or sketched offsets are not yet "applied" they will be lost upon deselection.

GUI

In this mode the GUI is used to edit the stylization and behavior of the currently selected line type. Controls common to this mode and hatching mode are described first, followed by the controls specific to line editing mode.

Common Stroke Controls

These controls comprise the parameters which govern stroke rendering.

Presets Management

Strokes parameter sets can be grouped together into named presets and saved to disk.
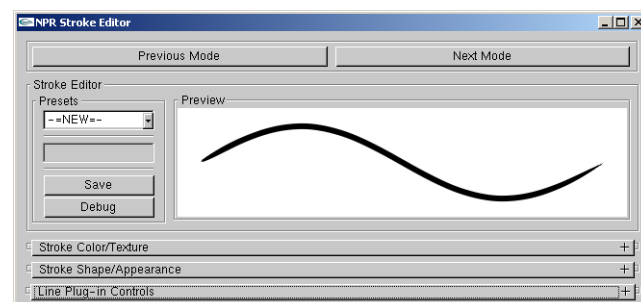
Presets Management.

Presets

List box for selecting amongst the available presets.

Save

If "-=NEW=-" preset is selected, a new preset will be created from the current settings. If an existing preset is selected, it will be overwritten with the current settings.

Debug

> Don't ask...

Preview

> Displays the current active settings. Up to five example strokes can be sketched in this box.

Color and Texture Settings

Parameters which govern the rendering of the stroke triangle strip.
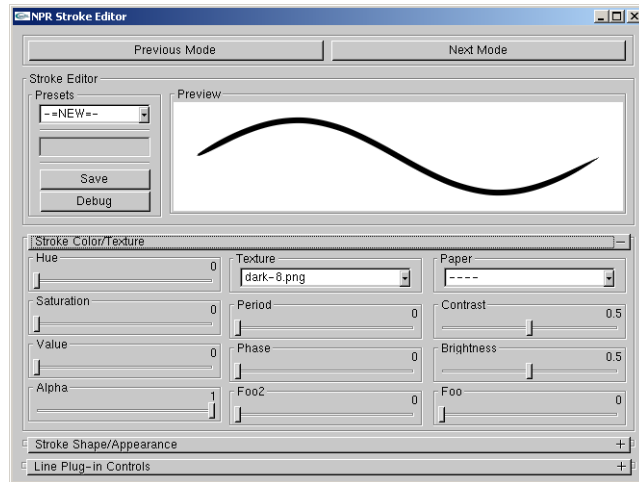
Color and Texture Settings.

Hue, Saturation, Value

> Set the stroke color.

Alpha

> Set the stroke alpha. This is analogous to pressure wrt paper effect simulation shader.

Texture

> Select an alpha texture. The texture can be applied as a 1D or 2D texture. If 1D then the Y direction is mapped across the width of the stroke. If 2D then the X direction is mapped along the length of the stroke.

Period

> If ZERO then texture considered 1D. If NON_ZERO then the texture is considered 2D with period equal to NON_ZERO pixel length.

Phase

> Phase offset (as a fraction of period length) applied to stroke parameterization (i.e. longitude in texture coordinates or sketched offset parameterization).

Paper

> Paper height field texture for paper simulation shader (n.b. strokes do not use the globally selected paper texture).

Contrast, Brightness

> Modify the paper height field texture.

Shape and Appearance

These controls influence mainly the shape of the stroke.
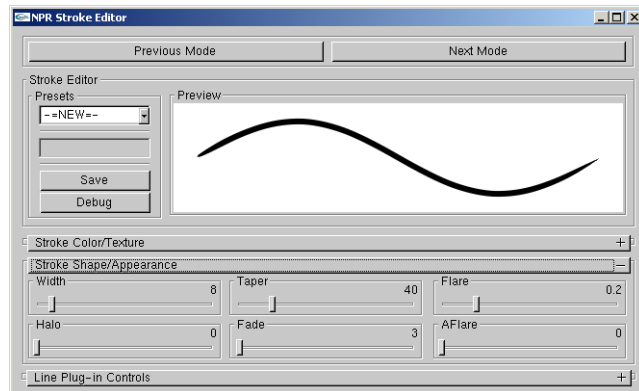
Shape and Appearance.

Width

Pixel width of the stroke.

Halo

Don't ask...

Taper

Distance in pixels over which the end points are tapered.

Fade

Distance in pixels over which the end points are faded using alpha.

Flare

Fraction of the stroke over which the width is tapered from one end.

AFlare

Fraction of the stroke over which the width is faded from one end.

Line Mode Specific Controls

These remaining controls are specific to the line mode.

Line Type Settings

These flags control which line types are rendered for the selected mesh. Silhouette (SIL), backfacing silhouette (BAK), border (BOR), and crease (CRE) line types can be optionally rendered. The visible (VIS), hidden (HID), and occluded (OCC) portions of each line type can be toggled for rendering separately.
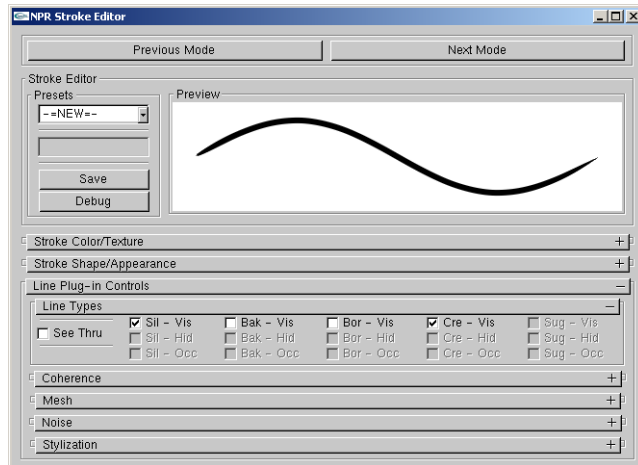
Line Type Settings.

See Thru

> "See thru" objects can render hidden and occluded line types. Non "see thru" objects can render only visible types. Non "see thru" objects can cause hidden lines on "see thru" objects to become occluded lines.

Sil-Vis, Bak-Vis, Bor-Vis, Cre-Vis

> Toggle rendering of the visible line types.

Sil-Hid, Bak-Hid, Bor-Hid, Cre-Hid

> Toggle rendering of the hidden line types.

Sil-Occ, Bak-Occ, Bor-Occ, Cre-Occ

> Toggle rendering of the occluded line types.

Coherence Settings

Settings which govern how a coherent parameterization is applied to each line type from frame to frame (see corresponding paper[1]).
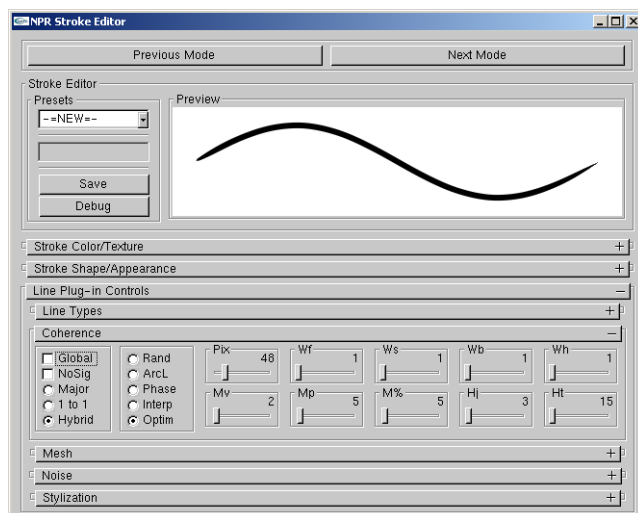
Coherence Settings.

Global

> If checked, all other parameters in this section are ignored and the global defaults are used.

NoSig

> If checked, the onscreen mesh size doesn't influence parameterization (i.e. sigma, rho = 1)

Major, 1 to 1, Hybrid

> Policy for assigning brush paths.

Rand, ArcL, Phase, Interp, Optim

> Policy for fitting parameterization to brush paths.

Pix

> Pixel spacing of polylines vertices for optimization fitting policy.

Wf, Ws, Wb, Wh

> Weights in energy expression for optimization fitting policy.

Mv

> Minimum number of votes per vote group.

Mp

> Minimum pixel length per vote group.

M%

> Minimum percentage of the lenght of the silhouette path per vote group.

Hj

> Pixel length threshold for healing together brush paths.

Ht

> Pixel length threshold for coercing brush paths to heal.

Mesh Settings

Various meshwide settings.
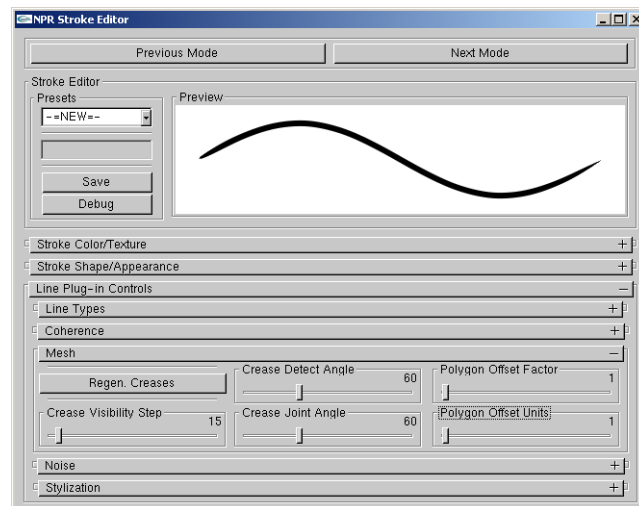
Mesh Settings.

Crease Detect Angle

>   Dihedral angle threshold for considering a mesh edge to be a crease.

Regen. Creases

>   Regenerates the mesh creases using the current Crease Detect Angle threshold.

Crease Joint Angle

>   Adjacent crease edge joint angle threshold for connecting creases in contiguous paths.

Crease Visibility Step

>   Pixel spacing of crease visibility testing under legacy crease rendering mode (don't ask...).

Polygon Offset Factor, Polygon Offset Units

>   Polygon offset parameters used to render mesh in ID image. Increase these values if line visibility is lousy.

Noise Settings

Line stylization noise (a.k.a. animation of stroke stylization) is achieved by assigning more than one stylization to a given line type and changing among them in time. Note, all additional stylization prototypes for a given line type must share the period (or sketched offset baseline length) of the first prototype.
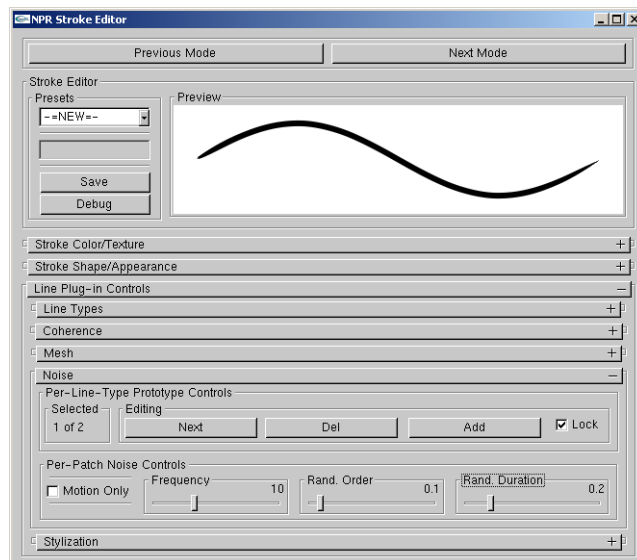
Noise Settings.

Selected

>   Indicate which stylization prototype is selected.

Next

>   Changes to the next stylization prototype.

Del

>   Delete current prototype.

Add

>   Add new prototype.

Lock

> Force rendering to lock to current prototype.

Motion Only

> Animation only occurs when camera is in motion.

Frequency

> Number of times per second that the prototype is cycled.

Rand. Order

> Degree to which the prototype cycling order is randomized.

Rand. Duration

> Degree to which the prototype cycling duration is randomized.

Stylization Controls

These controls govern the selection, adding, removal, and editing of stroke stylization for lines types.
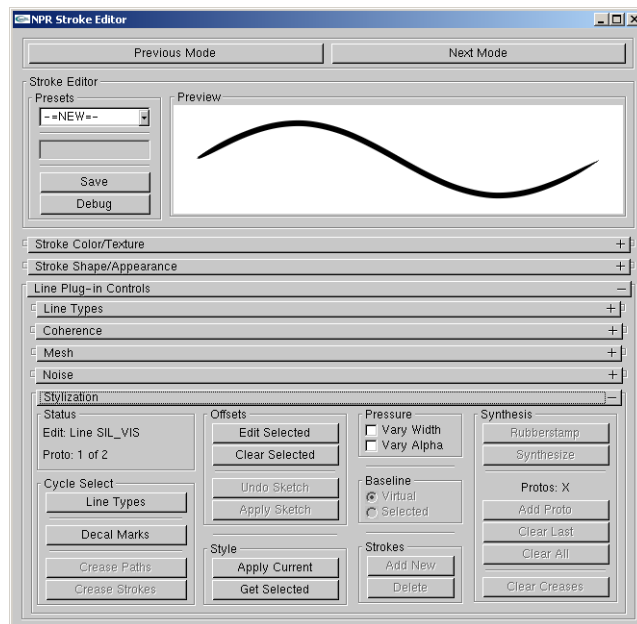
Stylization Controls.

Status

> This field indicates the currently selected entity.

Line Types

> Cycle selection between the line types (e.g. SIL-VIS, CRE-HID).

Decal Marks

> Enter decal editing mode and cycle selection of existing decals.

Crease Paths

> Cycle selection of legacy style crease paths (don't ask...).

Crease Strokes

> Don't ask...

Edit Selected (**h**)

> Edit the sketched offset stylization of selected line types.

Clear Selected

> Clear the sketched offset stylization of selected line types, or clear the selected decal.

Undo Sketch (**Esc**)

> Remove the last mark from the current set of sketched offsets.

Apply Sketch (**y**)

> Apply the current set of sketched offsets to the chosen line type, or generate decals.

Apply Current (**u**)

> Apply the current stroke parameters (as seen in the Preview window) to the currently selected entity.

Get Selected (**j**)

> Replace the current stroke parameters (as seen in the Preview window) with those of the currently selected entity.

Vary Width, Vary Alpha

> Toggle effects caused by tablet pressure.

Virtual Baseline, Selected Baseline

> Type of baseline for sketched offsets.

Add New, Delete

> Add and remove legacy style crease strokes (don't ask...).

Synthesis

> Stylization synthesis for legacy style crease strokes (don't ask...).

Editing Mode - Hatching Editing Mode

> TODO.

Mouse

TODO.

GUI

TODO.

Common Stroke Controls

See previous line editing section.

Hatching Mode Specific Controls

TODO.

Editing Controls

TODO.
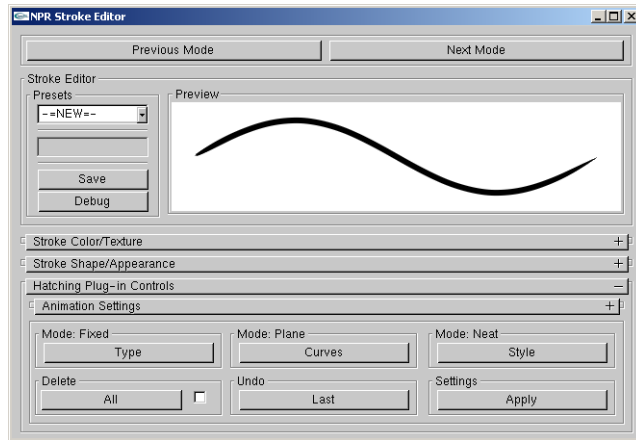
Editing Controls.

Type

Curves

Style

All

Last

Apply

Animation Settings

TODO.
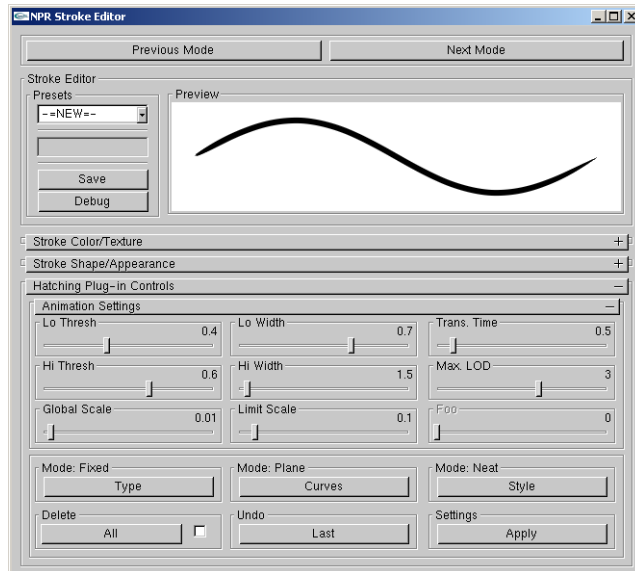
Animation Settings.

Lo Thresh

Hi Thresh

Lo Width

Hi Width

Global Scale

Limit Scale

Trans. Time

Max. LOD

Editing Mode - Basecoat Editing Mode

The triangle meshes of objects can be rendered using an arbitrary number of shaders composited in layers. The result is called the basecoat.

Mouse

Left-clicking the mesh will select it.

GUI

The GUI displays the basecoat configuration of the currently selected object.

Layer management

The basecoat is composed of shaders arranged in layers. The layer editor displays the current set of layers in the order in which they are composited. It also facilitates the adding and removing of shader layers.
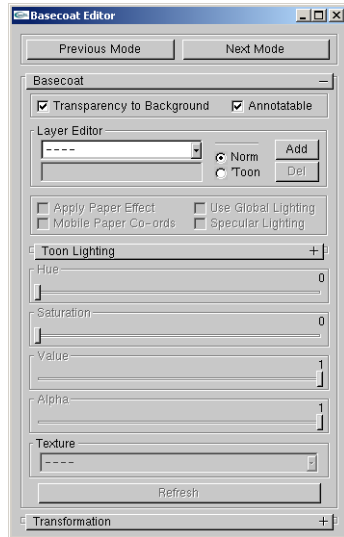
Layer management.

Layer Editor List Box

Selects the current active layer. A layer consists of one shader either a normal shader or a toon shader. Layers are numbered in order and layer zero is composited first. A selection "----" indicates that no layer is selected.

Layer Editor Text Box

Text entered here is used to name the active layer.

Norm, Toon

Selects the type of shader to be created, when a layer is added.

Add

Adds a new layer of the currently selected type after the current active layer. To insert a layer before the zero layer, set the active layer to "----".

Del

Deletes the current active layer.

Transparency to Background

If checked, a special layer is composited first, before the zero layer. This shader renders the mesh triangles to look identical to the background, accounting for the current background texture, paper, etc.

Annotatable

If unchecked, this object is not rendered into the ID image. This will cause visibility to fail on all stroke-based effects. This can be useful to achieve transparent objects which do not occlude the strokes of objects behind them.

Normal Shaders

When a normal shader layer is selected, the remaining basecoat controls adapt to display the relevent settings. The normal shader consists of a solid color, optional texture map, optional alpha and optional paper shader, and can be lit by the global lighting environment.
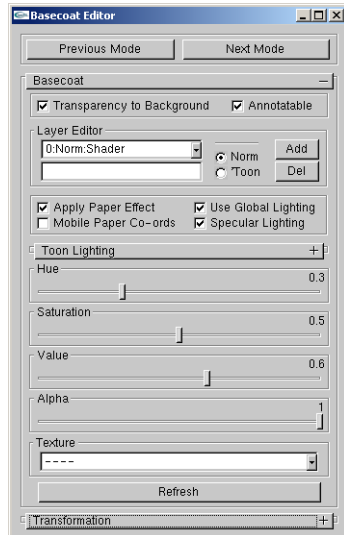
Normal Shaders.

Hue, Saturation, Value

Sets the solid color of the shader.

Alpha

Sets the alpha used for compositing this layer. This is analogous to pressure w.r.t. paper effect simulation shader.

Texture

Selects an optional texture map to modulate the triangles. This texture map could include alpha.

Apply Paper Effect

Enable paper effect shader on this layer.

Mobile Paper Co-ords

If unchecked, the paper shader's height field texture, for this layer, is fixed in screen space. If checked, the height field texture moves with the bounding box of the object.

Use Global Lighting

If checked, triangles are modulated by the current diffuse lighting environment.

Specular Lighting

Adds a white specular component to each active light.

Refresh

Regenerates the texture list.

Toon Shaders

When a toon shader layer is selected, the remaining basecoat controls adapt to display the relevent settings. Toon shading is defined by a diffuse lighting calculations which looks up into a 1D texture. Here, the toon shader consists of a solid color, a 1D texture map, a lighting description, an optional alpha and an optional paper shader.
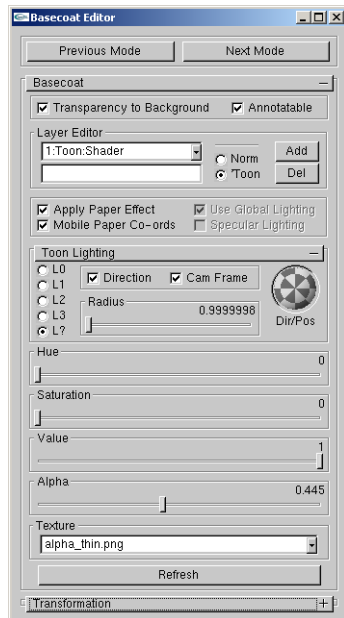
Toon Shaders.

Hue, Saturation, Value

Sets the solid color.

Alpha

Sets the alpha used for compositing this layer. This is analogous to pressure w.r.t. paper effect simulation shader.

Texture

Sets the 1D lookup texture. Optionaly contains alpha.

Apply Paper Effect

Enable paper effect shader on this layer.

Mobile Paper Co-ords

If unchecked, the paper shader's height field texture, for this layer, is fixed in screen space. If checked, the height field texture moves with the bounding box of the object.

L0, L1, L2, L3, L?

Switch the light to use. L0 through L3 are the global lights. L? specifies a light unique to the active layer.

Direction

If checked, directional light, if unchecked, positional light.

Cam Frame

If checked, light is stationary in camera frame, if unchecked, light is stationary in world frame.

Dir/Pos

> Sets direction/position of light.

Radius

> Sets the radius of light from the camera/world origin.

Refresh

> Regenerates the texture list.

Transform

Controls for transforming objects in the scene. This is mostly a hack, these operations will be performed in Maya, Lightwave, etc.
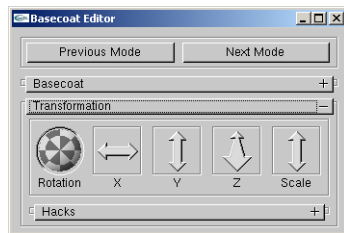
Transform.

Global Parameters

These windows collect all the global settings such as background and lighting.

Lighting

`Jot` supports up to four positional/directional light sources and one global ambient light source. Lighting can have an effect on the normal and toon shaders described in the basecoat section.
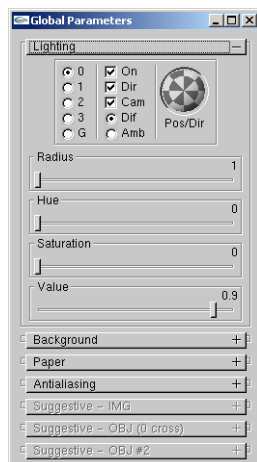
Global lighting parameters.

0, 1, 2, 3

> Select one of the four positional/directional lights to edit. When a light is selected the other controls will change to reflect the chosen light settings.

G

> Select global ambient light.

On

> Light is active when checked.

Dir

> Light is directional when checked, positional when not checked.

Cam

> Light position/direction is defined in terms of camera frame when checked, world frame when not checked.

Dif/Amb

> Select the editing of diffuse/ambient color of light.

Pos/Dir

> Adjust position/direction of the light.

Radius

> Adjust the radius from world/cam origin associated with positional light.

Hue, Saturation, Value

> Adjust color of the chosen light.

Background

The background is rendered as a solid colored quad with optional texture mapping and paper shader.
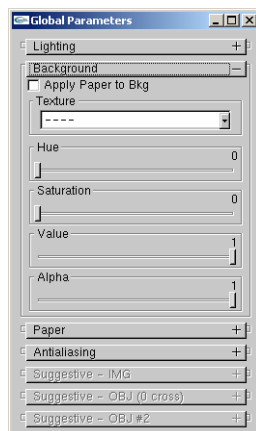
Global background parameters.

Hue, Saturation, Value

> Adjust the color of the background.

Alpha

> Adjust the alpha of the background. This has effect in conjunction with the paper shader.

Texture

> Select an optional texture map to apply to background quad. The list box is populated with textures from the appropriate directory (see description of file tree).

Apply Paper to Bkg

> Apply paper shader.

Paper

A paper effect shader can be applied to basecoat shader, strokes, and the background. The paper parameters selected here affect only basecoat and the background.
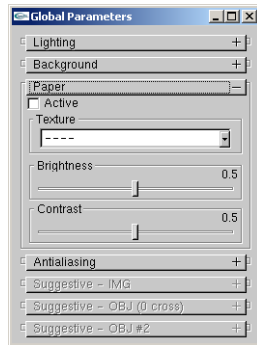
Global paper parameters.

Active (p)

> Global override to disable all paper shaders, including strokes.

Texture

> Select global paper height field texture. The list box is populated with textures from the appropriate directory (see description of file tree).

Brightness, Contrast

> Adjust the global height field texture.

Antialiasing

Full scene jittered antialiasing is implemented using the accumulation buffer. This incurses a tremendous performance hit, making it useful for batch rendering of animations.
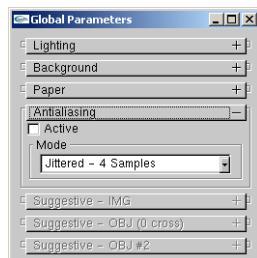
Global antialiasing parameters.

Active (a)

> Toggle antialiasing on and off.

Mode (A)

> Select an antialiasing scheme, i.e., number of jittered passes.

Keyboard Commands

> **Warning**
>
> Key commands are only accepted when the WYSIWYG NPR rendering window has focus! They are case-sensitive. **Tab**, **Arrows** and modifiers (**Ctrl**, etc.) affect GUI windows which have focus.

Global Commands

These commands operate under all modes.

Quit (**q**)

Terminates the application.

Save scene (**s**)

Save the entire scene to `out.jot`.

Write mesh (**w**)

Write the mesh under the mouse cursor to `out.sm`.

Next Mode (**.**)

Change to the next Editing Mode (e.g. Basecoat Edition Mode).

Previous Mode (**,**)

Change to the previous Editing Mode (e.g. Basecoat Edition Mode).

Render Mode Menu (**M**)

Toggle display of the Render Mode Menu. Allows global override control of various shaders. (Select Textured Patch to render with NPR stylization shaders/strokes.)

Global Parameters Menu (**v**)

Toggle display of the Global Parameters Menu.

Reset View (**V**)

Adjust camera such that entire scene fits in render window.

Toggle Animator Mode (**X**)

Engage frame stepping of exported animation (see Tutorial).

Change Selected Style (**'**)

Cycles through various selection representations (e.g. wireframe, bounding box, etc.)

Toggle Repair (**'**)

Toggles whether or not system attempts to "repair" strokes with tight bends (work in progress...).

Toggle Paper Shader (**p**)

Toggles globally enabled/defeat paper shader.

Toggle Antialiasing (**a**)

Toggles full scene antialiasing.

Antialiasing Mode (**A**)

>Cycle through the available Antialiasing Modes. (All of which are slow without a hardware accumulation buffer.)

Line Mode Commands

See section on Line Mode.

Edit Selected (**h**)

>Edit the sketched offset stylization of selected line types.

Undo Sketch (**Esc**)

>Remove the last mark from the current set of sketched offsets.

Apply Sketch (**y**)

>Apply the current set of sketched offsets to the chosen line type, or generate decals.

Apply Current (**u**)

>Apply the current stroke parameters (as seen in the Preview window) to the currently selected entity.

Get Selected (**j**)

>Replace the current stroke parameters (as seen in the Preview window) with those of the currently selected entity.

Hatching Mode Commands

See section on Hatching Mode.
TODO.

Animation Commands

See tutorial on Animation.

Toggle Animator Mode (**X**)

>Engage frame stepping of exported animation (see Tutorial).

Back 1 Frame (**4**)

>Step 1 frame backward.

Forward 1 Frame (**6**)

>Step 1 frame forward.

Back 10 Frames (**2**)

>Step 10 frames backward.

Forward 10 Frames (**8**)

>Step 10 frames forward.

First Frame (**5**)

>Go to first frame.

Play (**/**)

>Play entire animation.

Stop (+)

>Stop playing animation.

Toggle Sync (-)

>When engaged, system time is synchronized with frame number. When disengaged, system time is interactive real-time.

Toggle Disk (*)

>Toggle if playback causes frames to be rendered to disk. (Requires Sync Mode to be enabled.)

Notes

1. http://www.cs.princeton.edu/gfx/proj/css/

Chapter 5. `Jot` Setup

How to obtain `Jot`

Got to the Jot Homepage[1].

Requirements

`Jot` requires nVidia GeForce or ATI Radeon 8000 series graphics hardware on Microsoft Windows (Linux coming soon).

Installation

1. Unpack the `jot.zip` in the desired directory *DEST*.
2. Edit `jot-config.bat` so that *JOT_ROOT* is now equal to *DEST*\jot.
3. For MS Windows users: Edit the properties of the `jot-cmd` file and set its target to *DEST*\jot\batch\jot-config.bat.
4. Execute `jot-cmd` shortcut to launch `Jot` command line.
5. Start out with the basic tutorial.

File Tree and File Formats

File Tree

`jot\`

Location of `Jot` command line shortcuts and README.txt.

`batch\`

Various batch files for configuring and invoking `Jot`.

`bin\`

Handy shell tools for MS Windows, e.g. `cd`, `ls` and `tiff2png`.

`D\`

Debug binary (invoke with `jotd.bat`).

`Q\`

Optimized binary (invoke with `jotq.bat`).

`R\`

Release binary (invoke with `jotr.bat`).

`manual\`

This manual in html and pdf format.

`tutorials\`

`tutorial-1\`

`Jot` scene files for the basic tutorial.

`tutorial-2\`

`Jot` scene files for the intermediate tutorial.

`tutorial-4\`

Lightwave scene files and sample exported `Jot` scenes for the animation tutorial.

`models\`

Sample models in `Jot` format.

`nprdata\`

`background_textures\`

Background images. Can contain alpha.

`debugging\`

Don't ask...

`other_textures\`

2D Texture maps for the Normal Shader. Can contain alpha.

`paper_textures\`

Can contain alpha as well.

`stroke_presets\`

Saved stroke styles.

`stroke_textures\`

Stroke texture maps. Can be 1D or 2D. White in the color channel and "pressure" in the alpha channel.

`system_textures\`

Don't ask...

`toon_textures\`

1D Texture maps for the Toon Shader. Can contain alpha.

`scripts\`

Script files for exporting to `Jot` format from Lightwave, 3DS Max, Blender, etc.

File Formats

`.jot` File Format

Contains entire scene.

`.sm` File Format

Contains a single mesh.

`.npr` File Format

Contains stylization information.

`.view` File Format

Contains global scene parameters.

Animation File Format

TODO.

Notes

1. http://www.cs.princeton.edu/gfx/proj/jot/

Chapter 6. Questions and Answers

1. What is `Jot`?

No one can tell you what `Jot` is -- you must see for yourself.