



3DXpert™ for SOLIDWORKS®

Lattice Design

Sprouts and Rough Sprouts Lattice

Tutorial_V3 : 14,0200,1599,1024(SP2)

Introduction

3DXpert for SOLIDWORKS includes tools for creating optimized structures, using Lattices and Infills.

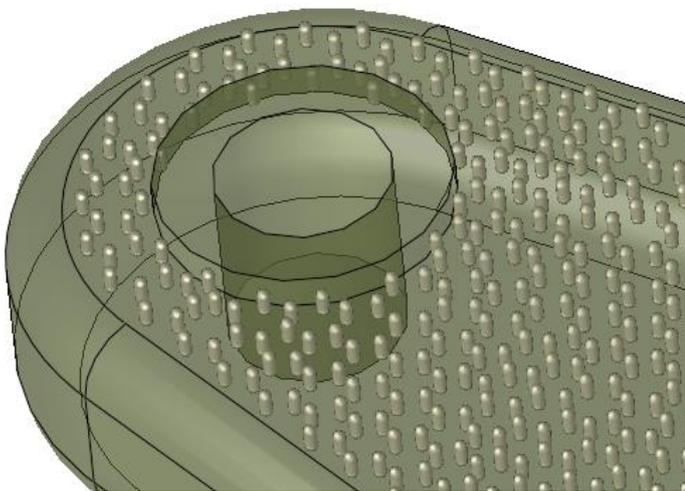
In addition, you can add textures to the top of an object's outer faces. This is called **Surface Lattice**.

For example, in medical application, such texture makes it easier for organic tissues (namely bones) to attach to it. Surface Lattice is typically used in medical applications.

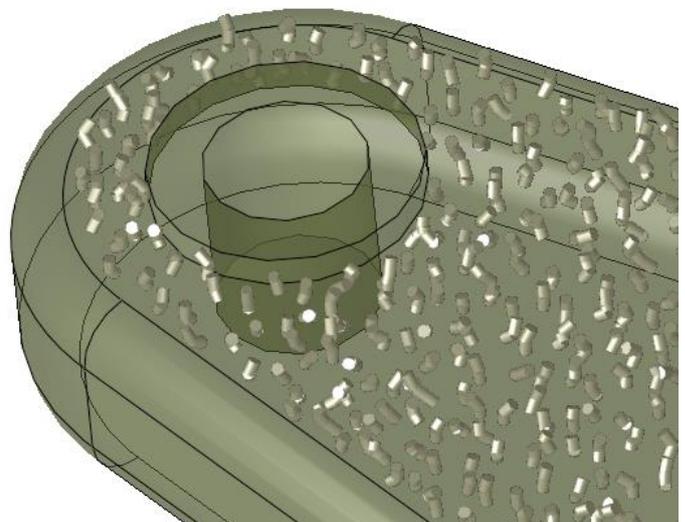
3DXpert for SOLIDWORKS offers various shapes of Surface Lattice.

This exercise discusses **Sprouts** and **Rough Sprouts** types.

Sprouts and Rough Sprouts are the basic shapes where sprouts spread over the surface with nodes and connectors shapes that user can select from a list.

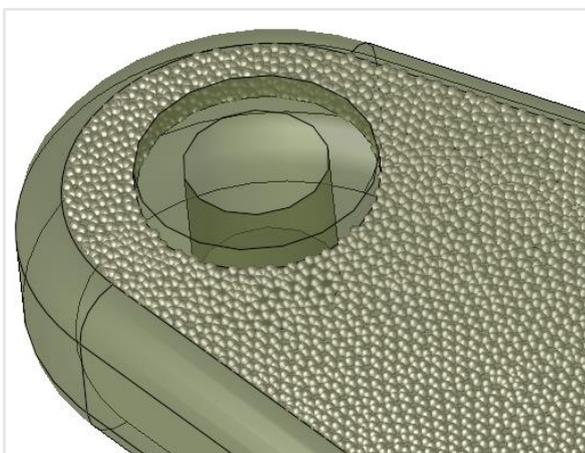


Sprouts Lattice:

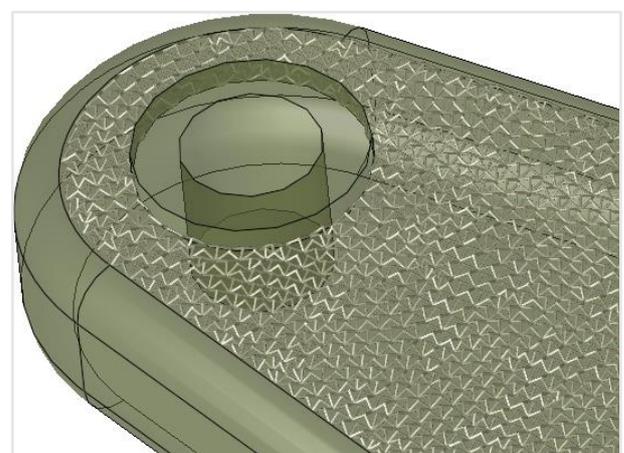


Rough Sprouts Lattice

The other Surface Lattice shapes will be discussed in a separate exercise called **3DXpert-Advanced Surface Lattice-Exercise**.



Spikes Lattice

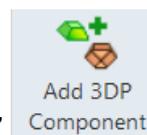


Tetrahedron Lattice

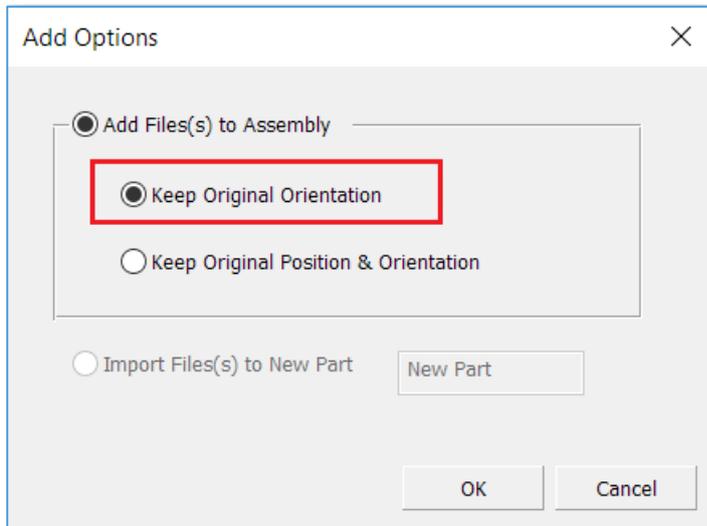
!	<p>When working with a Standard license, you can create a Sprouts and Rough Sprouts Surface Lattice, which you are able to slice and export to other software.</p>	
	<p>You can create additional Surface Lattice types (Tetrahedron, Spikes etc), however, in the Standard package, the additional Surface Lattice types are available in Evaluation mode.</p>	
	<p>In Evaluation mode you can create, save, edit and view the additional Surface Lattice types that you created, but you cannot slice or export them.</p>	
	<p>To enable slicing and exporting of the additional Surface Lattice types, upgrade your 3DXpert for SOLIDWORKS to either Lattice Professional ADD ON or the Professional package.</p>	

! Notice/ Remember		Left mouse button name is "pick"
		Middle mouse button name is "Exit"
		Right mouse button name is "Click"

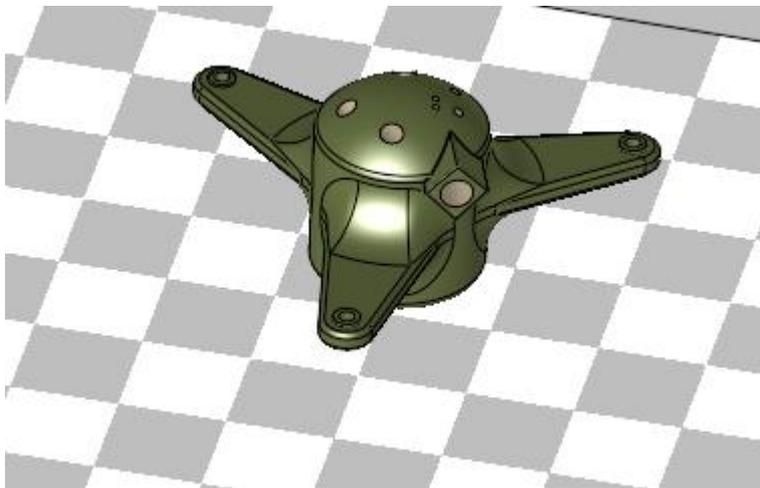
Exercise



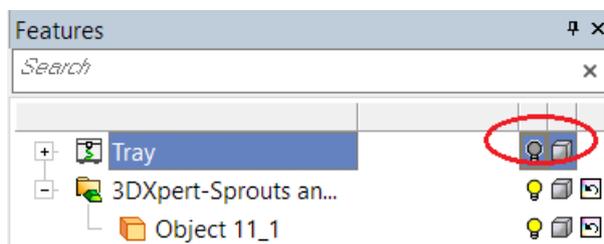
1. Open a new 3DP project and pick 'Add 3DP Component' tool.
The 3DXpert for SOLIDWORKS explorer opens up. Browse to the part '3DXpert-Sprouts and Rough Sprouts Lattice-V1.elt' and pick 'Select'.
2. Pick the option 'Original Orientation' and then pick 'OK'



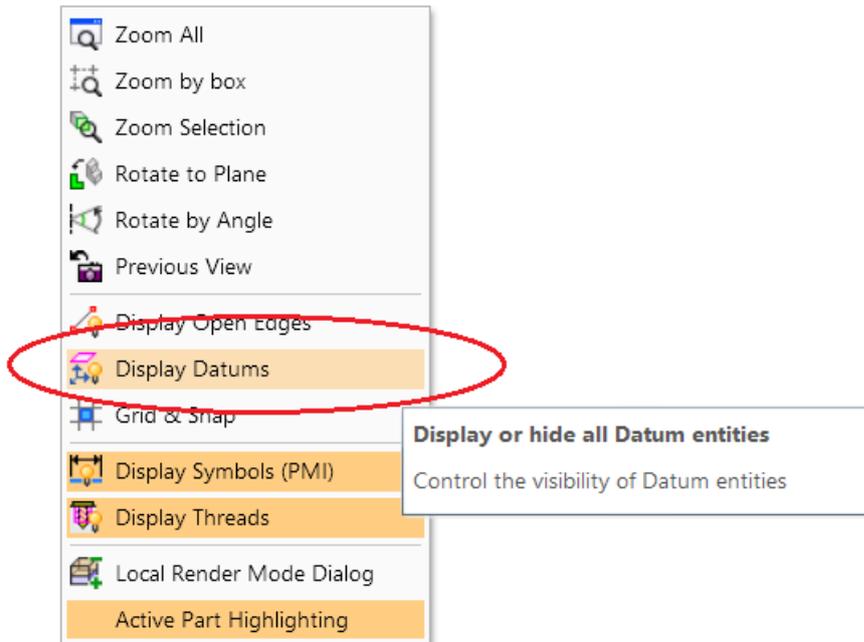
The part will be positioned on the tray:



Pick the light bulb from the features tree to hide the tray.



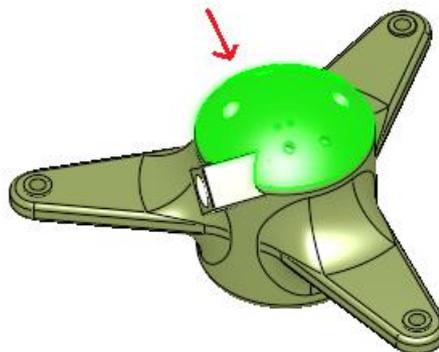
When the cursor hovers above the display area, click the Right Mouse and Middle Mouse buttons together and from the context menu pick 'Display Datum' to hide all datum.



3. From the Guide pick the 'Surface Lattice' button.



Pick the surface shown below and exit.



The Surface Lattice Parameters dialog opens up.
let's review how the dialog is set:

Surface Lattice

1

Cell Type

- Sprouts
- Rough Sprouts
- Tetrahedron
- Truncated Tetrahedron
- Connected Quads
- Spikes
- Solidify

2

Template:

Node Type: Sphere

Connector Type: Cylinder

Cell Size

Cell Size (S) 3.

Lattice Height (H) 3.

Number of Layers

Node and Connector Sizes

Element Thickness 0.1

3

Icons: [Apply] [Preview] [OK] [Cancel] [Close]

#1 - Lattice Type - in this section we define the surface lattice shape.

#2 - Cell Definition - in this section we set the cell's definition and parameters like cell size, node and connector types and size. A preview picture showing the cell shape is shown at the bottom of that section.

#3 - Actions Buttons Bar - OK, Show Preview, Cancel etc...



As you can see, there are various lattice types. In this exercise, we will focus only the Sprouts and Rough Sprouts types. We will discuss the other types on a separate exercise called **3DXpert-Advanced Surface Lattice.docx**.

4. Keep Sprouts option selected.

Let's review the parameters:

Node Type - Sets a node type (Like Sphere, Tetrahedron etc...) from the dropdown list of options.

Connector Type - Sets a connector type (Like Cylinder or Rhombic Prism) from the dropdown list of options.

Cell Size - Sets an approximate distance between roots.

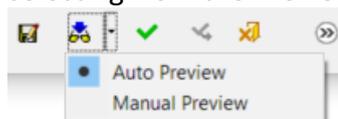
Lattice Height - Sets the height of the lattice above the selected surface.

Element Thickness - Sets size of the element.

Modify the parameters Node Type, Connector Type, Cell Size, Lattice Height and Element Thickness and observe the result on screen by picking the Preview button.



You can always switch the Preview mode between Manual Preview and Auto Preview by selecting from the Preview dropdown list:



Auto – the preview dynamically changes on screen when any change in the settings is applied.

Manual – the preview changes only when picking the Preview button.

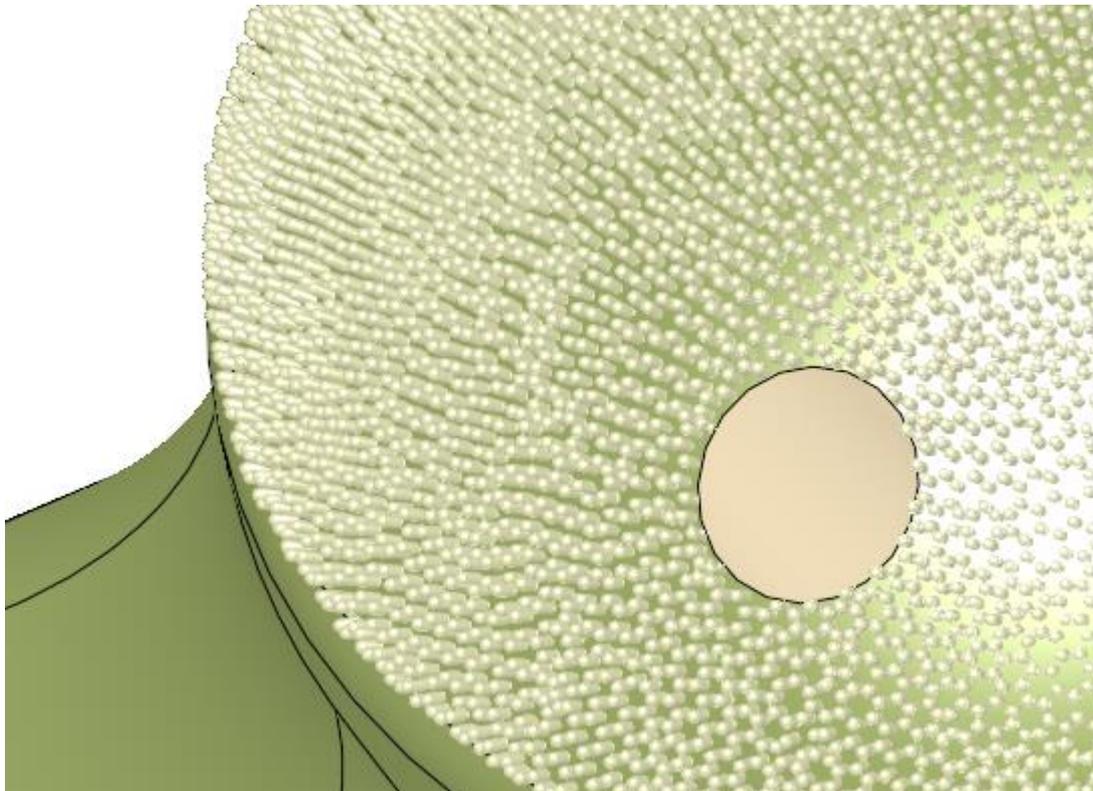
Set the following parameters:

Node Type:	Sphere
Connector Type:	Cylinder
Cell Size	
Cell Size (S)	0.8
Lattice Height (H)	0.5
Number of Layers	
Node and Connector Sizes	
Element Thickness	0.3

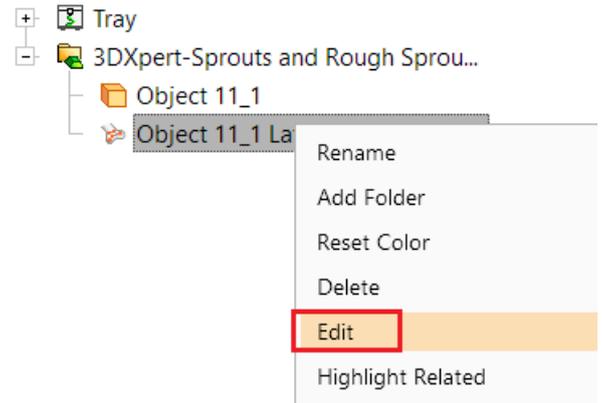
Pick Ok in the Actions bar.



Observe the result:



5. Right mouse click the Lattice from the features tree and pick 'Edit'



Pick Rough Sprouts:

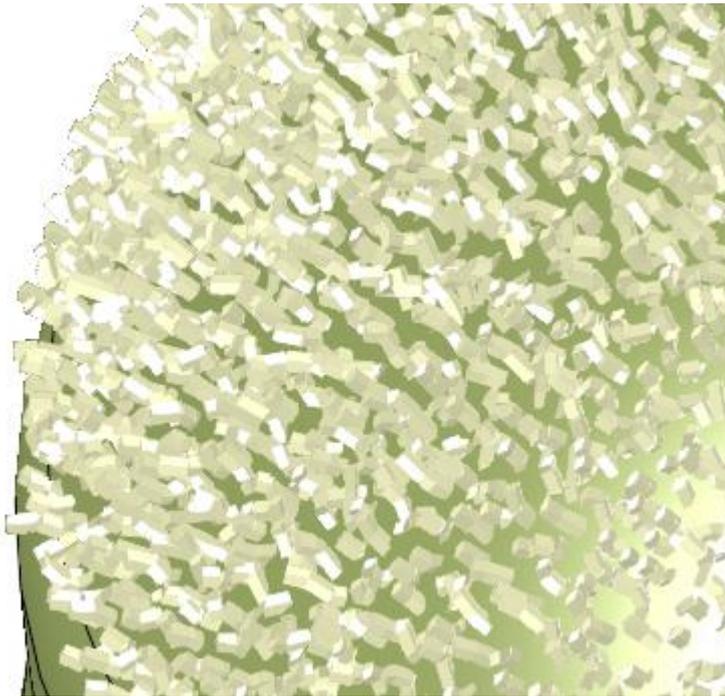


Change Connector Type to Rhombic Prism.

Pick Ok in the Actions bar.



Observe the result.



The Rough Sprouts type is less smooth than the Sprouts lattice.

End of Exercise.