



# **3DXPERT**

## **User Defined Lattice (Nodes & Connectors) Exercise**

Tutorial\_V2 - Updated: 13,0601,1489,1694(SP6P1)

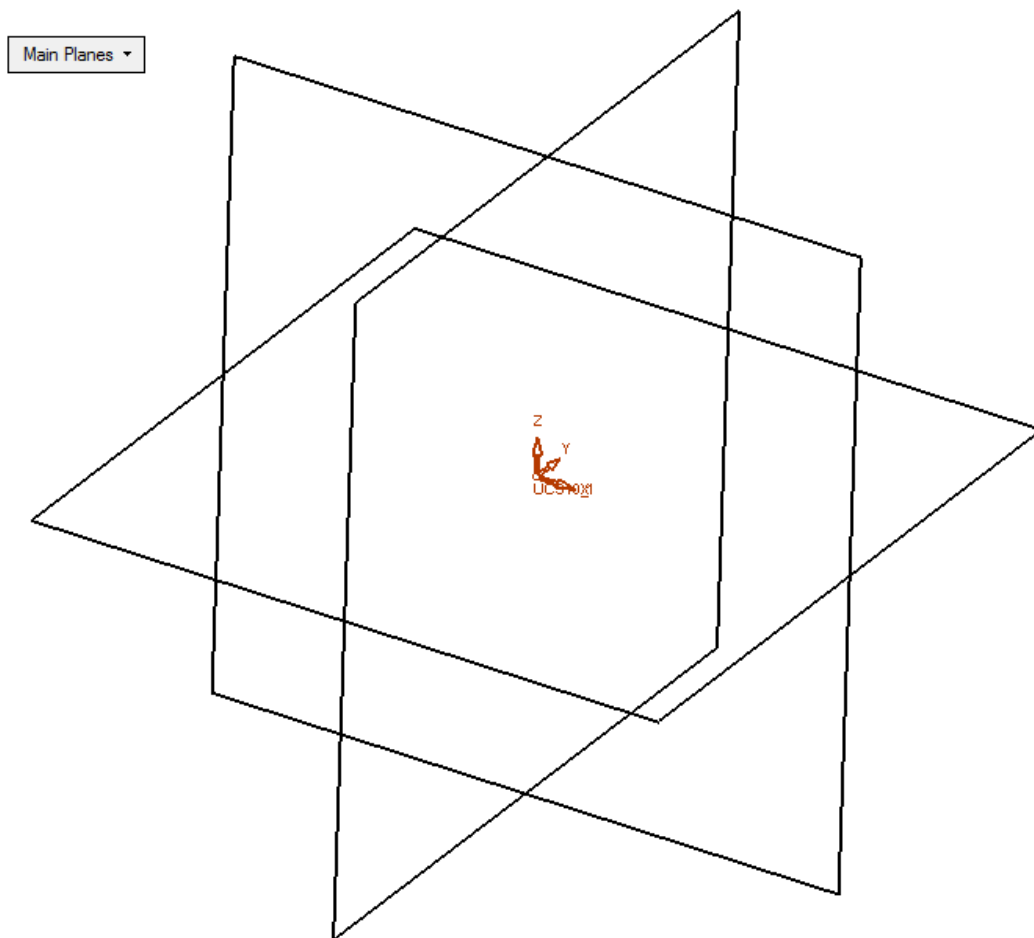
In this exercise, we will learn how to design a user defined lattice structure in 3DXpert.

1. Launch 3DXpert and open a new MM part file  
First, we will create a 2D geometry (a sketch) to be used for the lattice connector.



Please note that the 2D geometry should always be created on the XY plane.

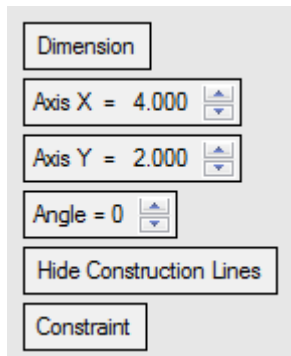
From the Wireframe>Datum menu, pick Main Planes tool. Select the main UCS to position main planes.



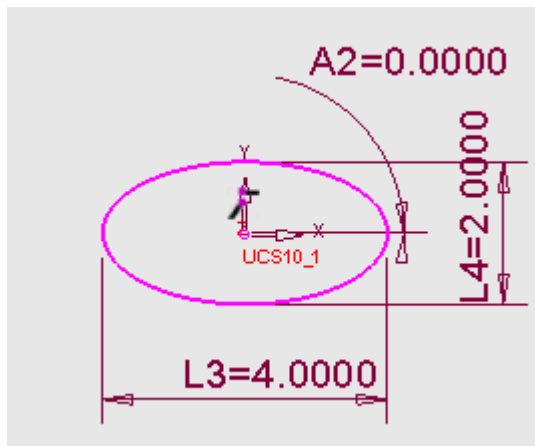
Pick OK in the Main Planes feature guide.

2. Invoke the Sketcher; select the XY plane as the reference plane.

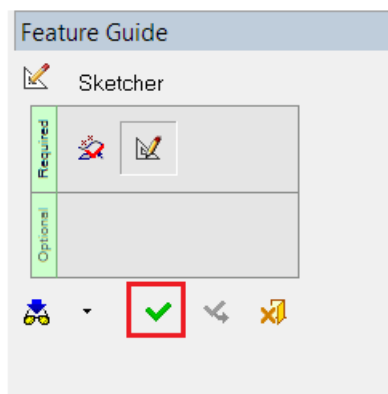
- Invoke the Ellipse command, use the “Dimension” mode and set the following dimensions:



- Pick the UCS to position the ellipse.



- Pick OK in the Sketcher Feature Guide.



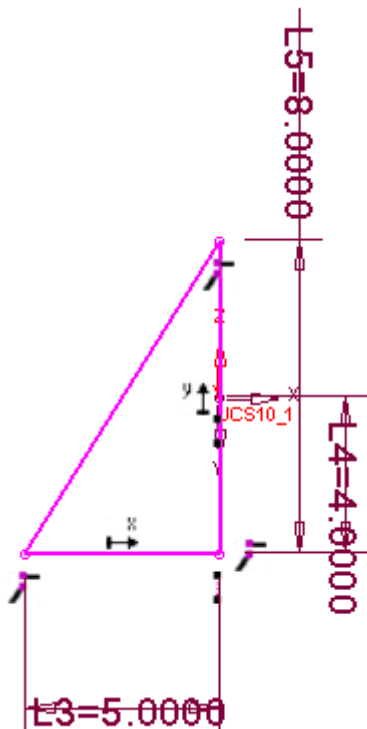
The next feature we will create is the node of the lattice.



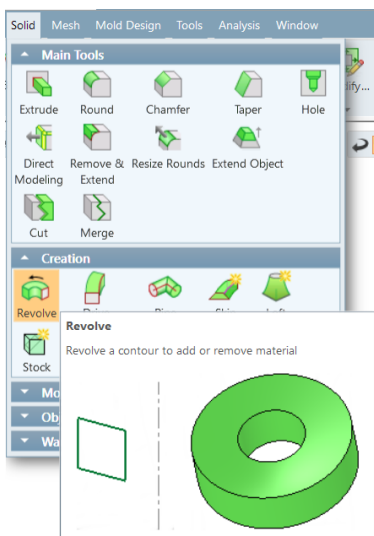
The node is a 3D object that should be modeled when the main UCS is positioned in the center of the node.

The Z direction of the object should be considered based on the orientation of the tray (When Z axes is up).

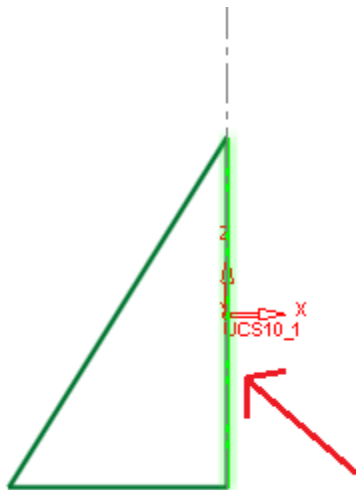
6. Pick the previously created sketch and pick Hide.
7. Invoke the Sketcher again and select the XZ plane as the reference plane.
8. Draw the following sketch and add dimension as follows



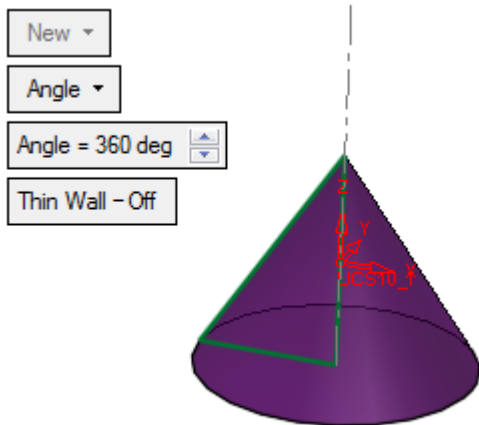
9. Pick OK in the sketch and invoke Solid>Revolve



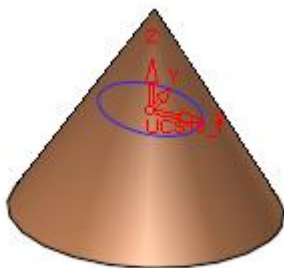
pick the previously created sketch and then pick the axis as shown below:



Apply the default settings and pick OK in the Features Guide

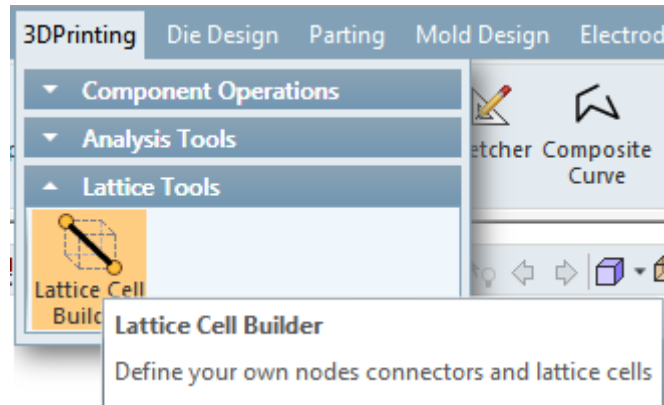


10. Pick 'Show All' to show also the previous sketch on screen.



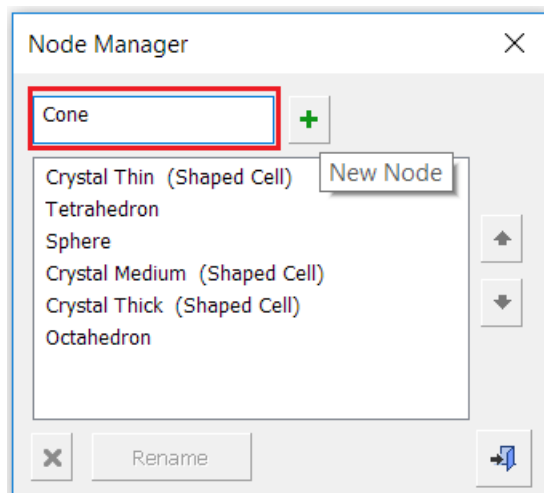
At this point, the Node and Connectors geometries are ready.  
Our next task is to define them using the Lattice Cell Builder.

11. Invoke the **Lattice Cell Builder** tool

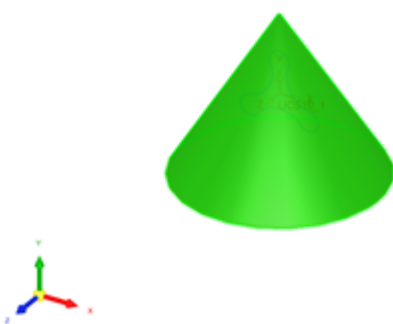


With this tool, you can define your own nodes and connectors for your lattice cell.

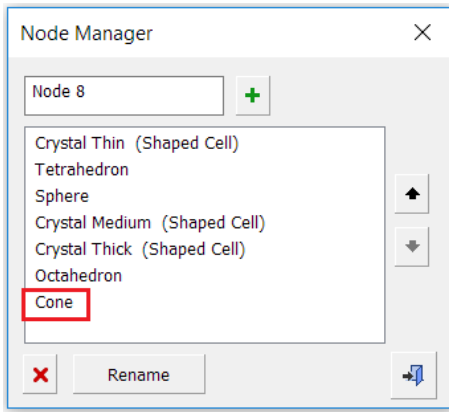
12. Pick 'Manage Nodes'. To add a new node, enter the new name 'Cone' and then press the '+' button:



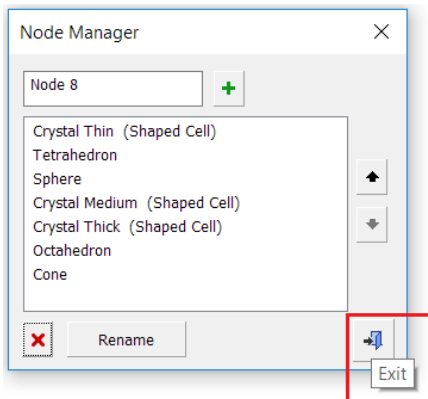
Select the cone from the screen:



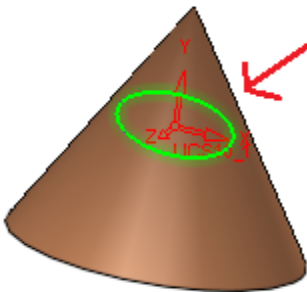
Note that this “Cone” is now in the list of available Nodes



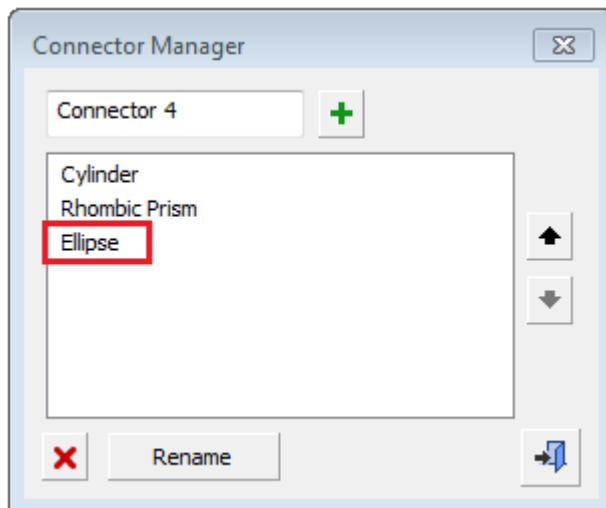
Exit the dialog



13. Pick 'Manage Connectors. Add a new connector and name it 'Ellipse' (The interaction is similar to Manage Nodes dialog). Pick the sketch from screen:



The connector is now in the list.

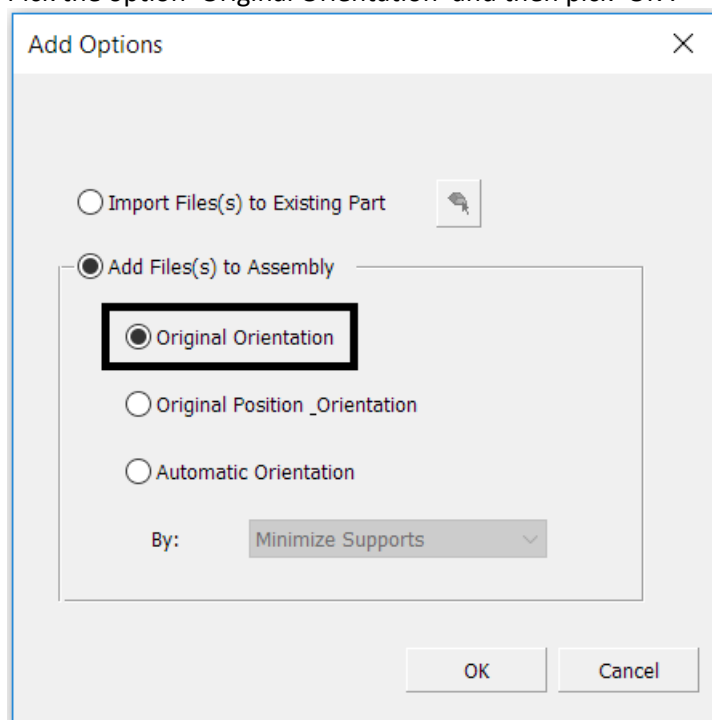


Close the dialog and close the Lattice Cell Builder tool.

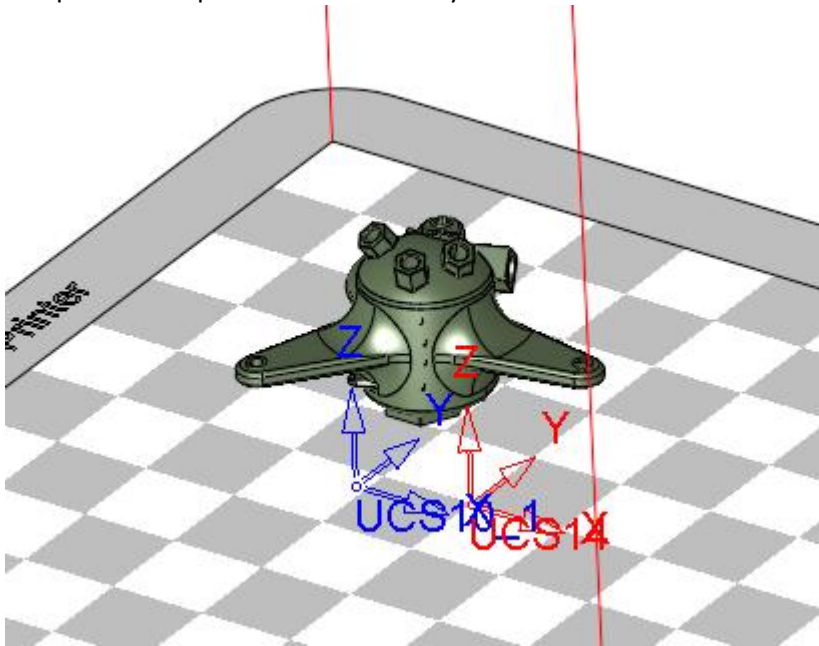
Close the part file. (It is not mandatory to save it)

Now let's apply the new lattice structure on a model.

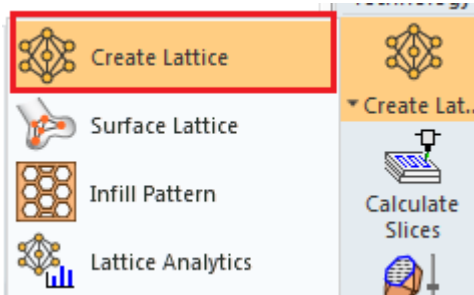
14. Open a new 3DP project and load the file **3DXpert-User Defined Lattice-V2.elt**.  
Pick the option 'Original Orientation' and then pick 'OK'.



The part will be positioned on the tray:

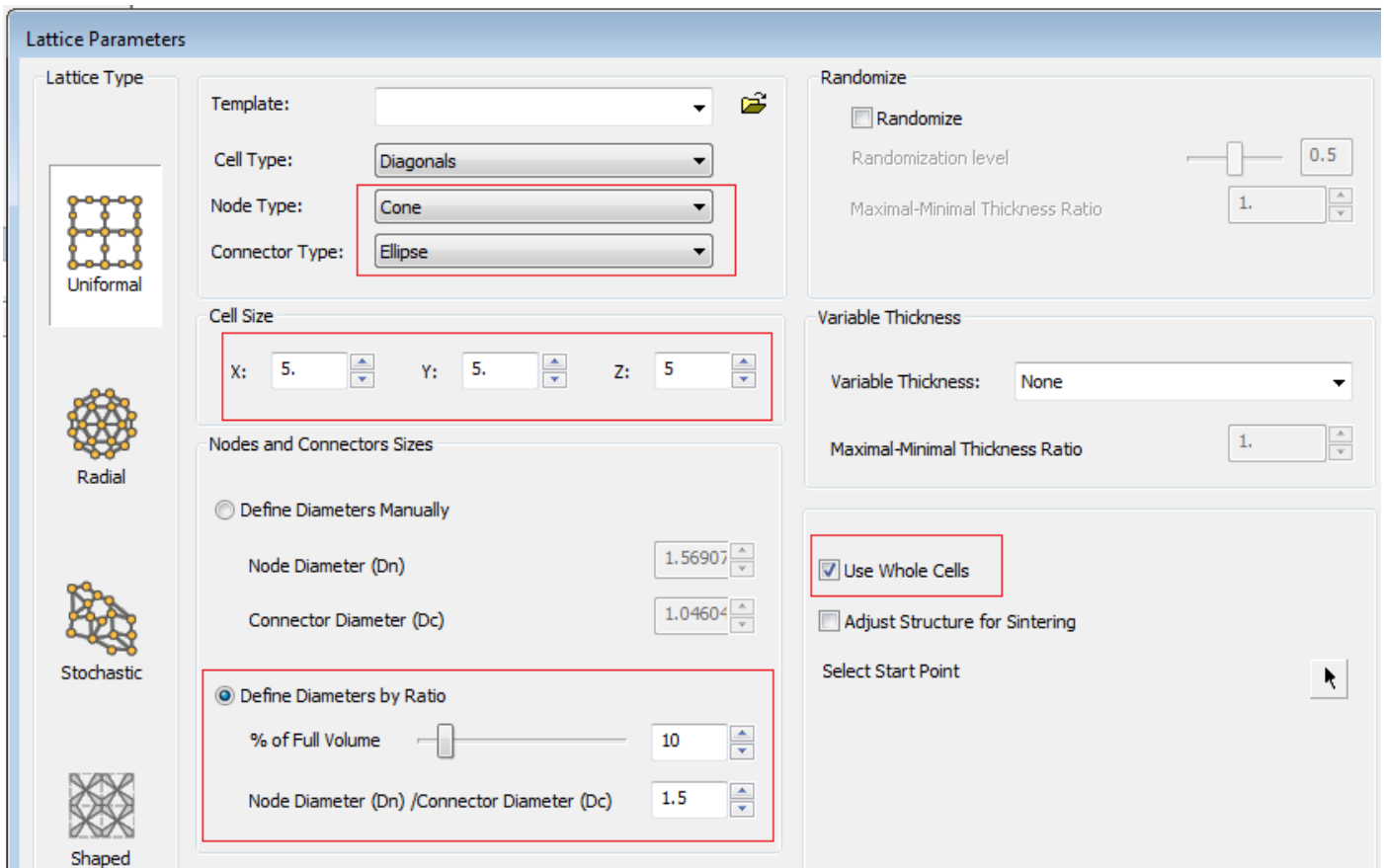


# 15. Pick **Create Lattice**

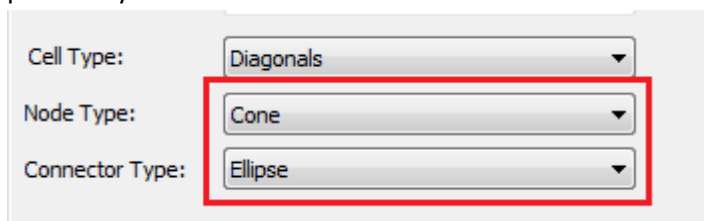


to invoke the Lattice tool.

Use the Uniform lattice type. Open the dropdown lists of Node Type and Connector Type, see that the

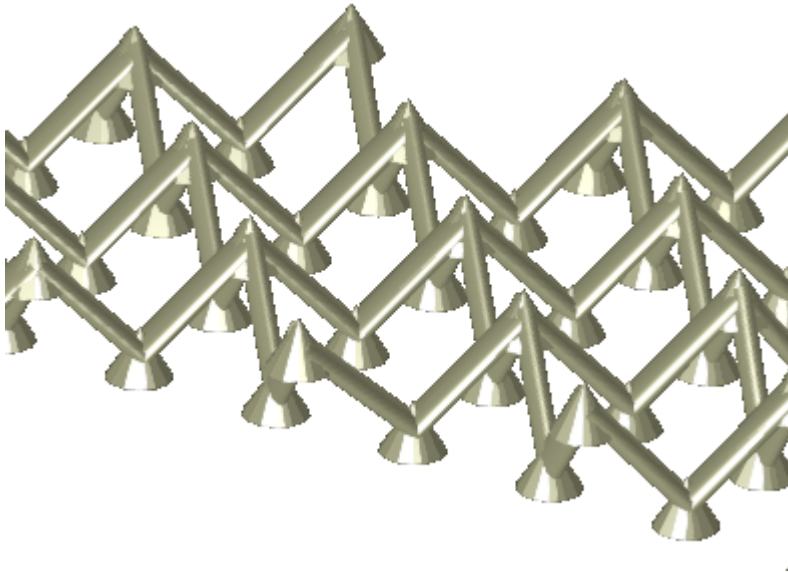


previously created elements are listed there. Select them.



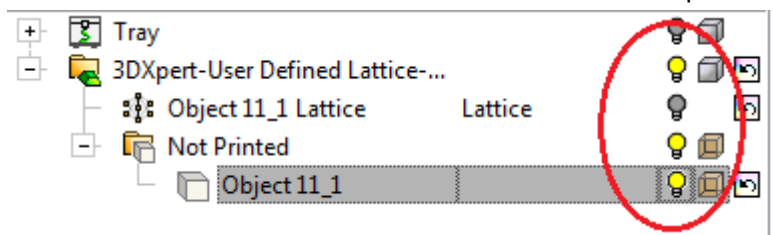
Set the following parameters and pick Ok to apply the lattice creation.

Zoom in to observe the result – these are the nodes and connectors that we have just designed.

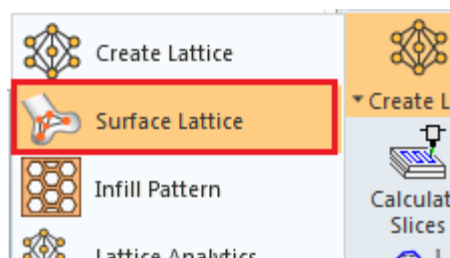


User defined nodes and connectors can be applied also on Surface Lattice.

16. Hide the lattice from the feature tree and show the “not printed” object.

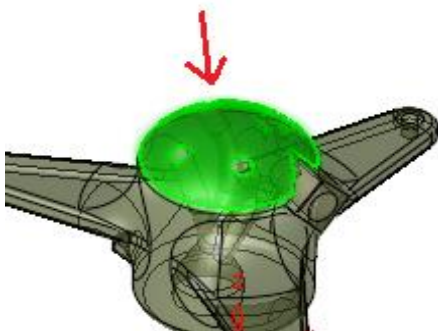


Pick **Surface Lattice**



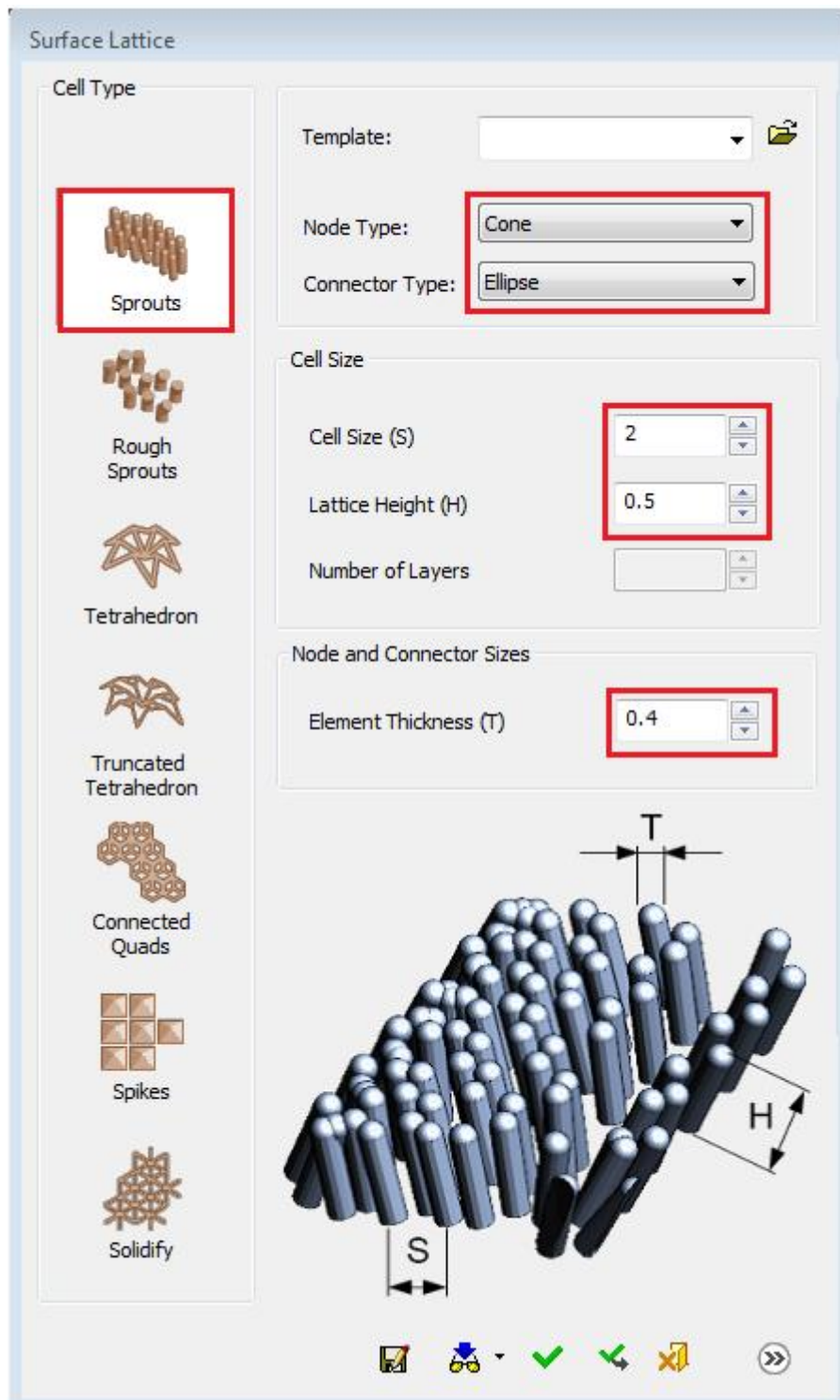
to invoke **Surface Lattice** tool.

Pick the upper face

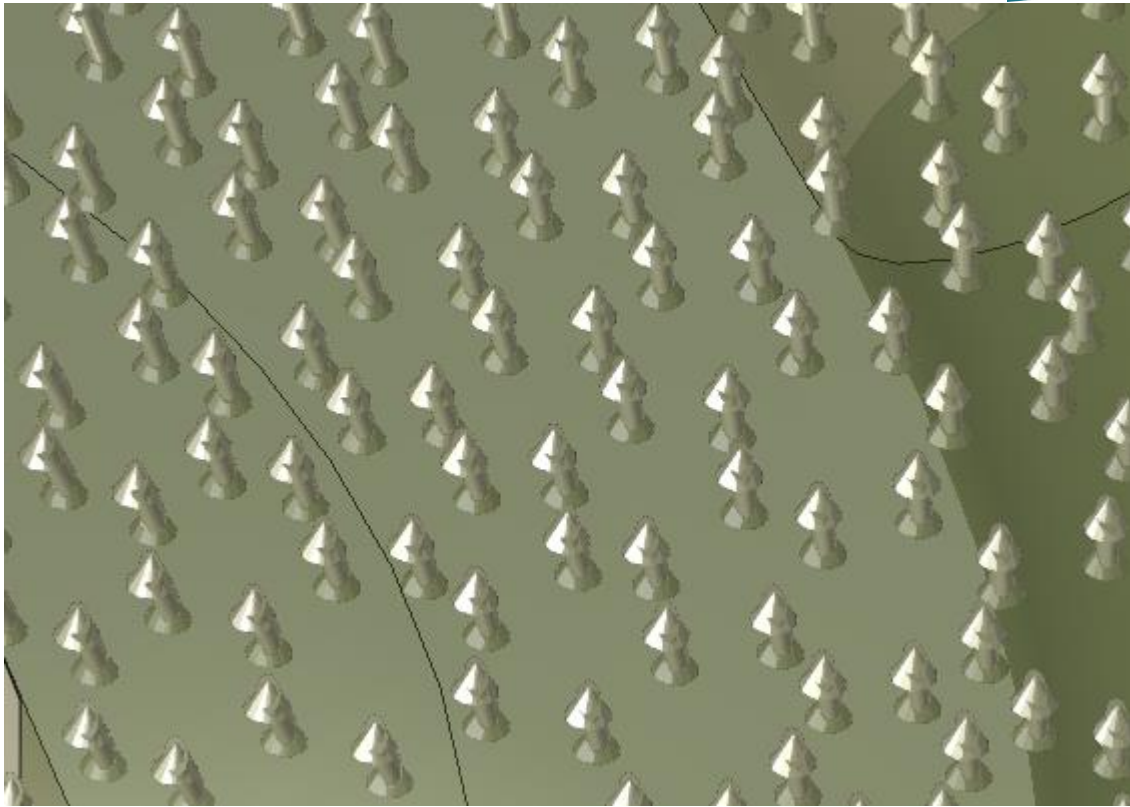


The new elements are shown also in Surface Lattice dialog.

Set the following parameters:



Pick Ok.  
Observe the result



Save the file.

**End of Exercise.**