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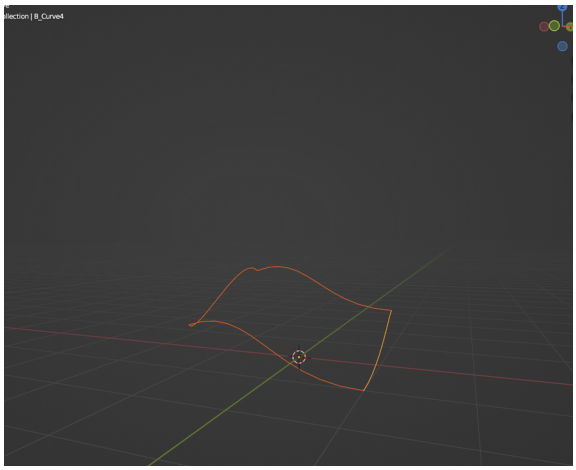
# CMPT 732: Practices in Visual Computing I

## Assignment-3: Part-2 – Blender Scripting Coons Patch

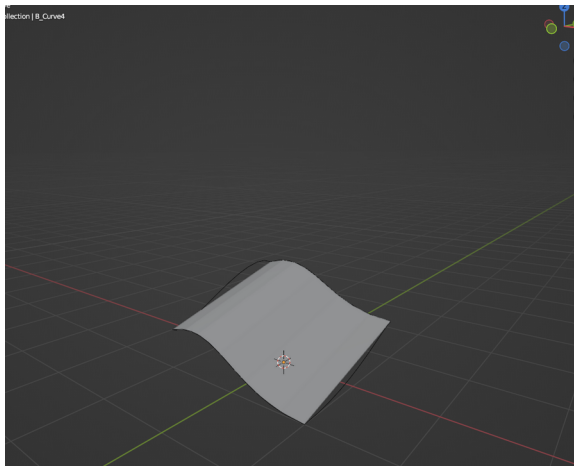
Bezier Curves – De Casteljau's Algorithm

- Using De Casteljau's algorithm, the bezier splines are created using the two endpoints and 2 handlepoints per curve. Since there are 4 points, the degree of the polynomial is 3.



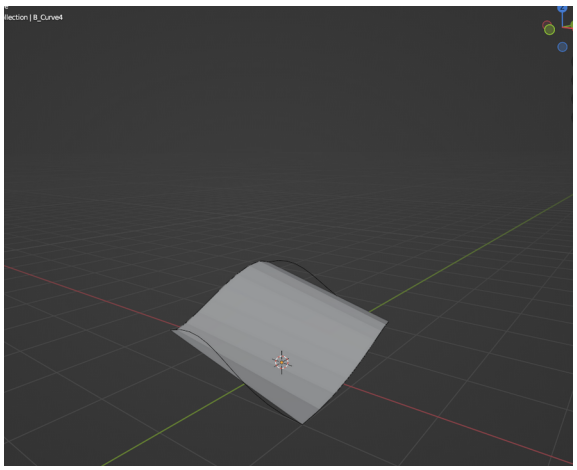
Surface 1 Patch by linearly interpolating Curve 1 and Curve 2

- Interpolating the points on the opposite curves 1 and 2 we get the ruled interpolated surface. Making a mesh object with the faces joining these opposite points (vertices), we can see the surface in the scene.



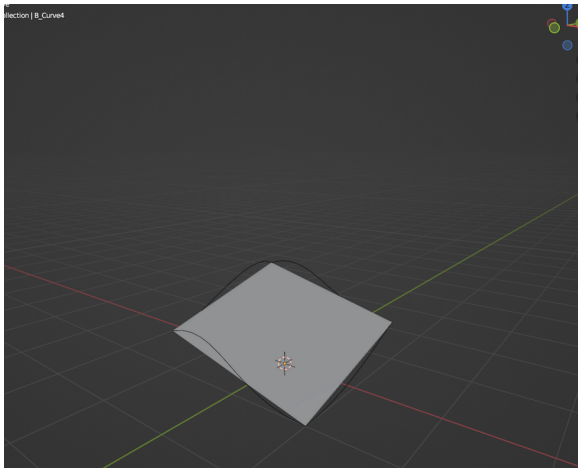
Surface 2 Patch by linearly interpolating Curve 3 and Curve 4

- Similarly we get the ruled surface for curves 3 and 4.



Surface 3 Patch by Bi-linearly interpolating corner points of all Curves

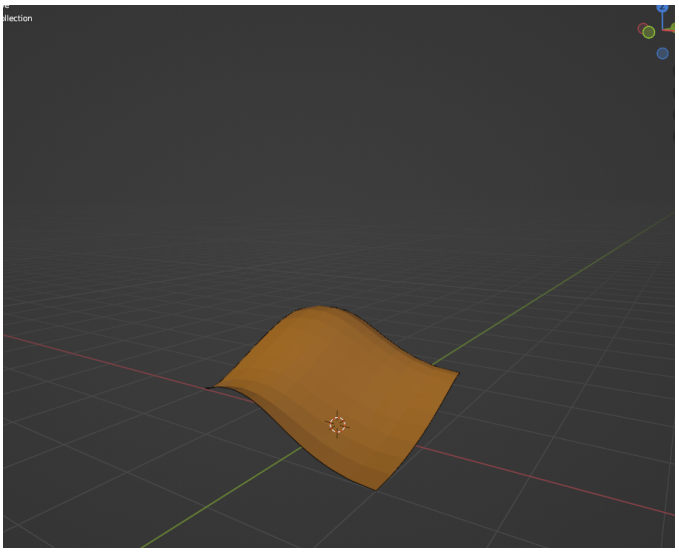
- Same as the above step but for corner points of the curves to the subtraction surface.



## Coons Patch

Finally, we can generate the coons patch by blending the surfaces together. This is done by Adding Surface 1 and Surface 2 together and then Subtracting Surface 3 from it. We pot the remaining surface as a mesh object with a diffuse colour material applied on it. We can also increase the resolution of the mesh by adding more vertices and faces. This is done by increasing number of interpolated points (N) along a curve using De Casteljau's Algorithm.

N = 11



N = 100