Reference List

This project mainly focuses on the implementation of 2 functions to support freeform surface, namely:
(1) Skinning Surface; and
(2) Digital Sculpting.
To facilitate the performance in terms of computational speed and memory usage, 2 data structures are adopted, namely Octree and Half-Edge.

Skinning Surface
Given a set of lists of data points to be interpolated, do Surface Global Interpolation to generate a set of lists of control points of the skinning surface. [link]
Do Curve Global Interpolation to vertical sets of points so that the points generated control a clamped surface. [link]
Do Uniform Cubic B-Spline Curves Interpolation to horizontal sets of points so that the points generated control an open surface. [link]
Wrap around the generated horizontal control points so that the surface generated is a closed surface. [link]
Use de Boor’s Algorithm with the generated control points to generate points on the surface. [link]
Triangulate these points to generate faces on the surface and display.


Digital Sculpting
Intersection Test
Subdivision
Sculpting Effect
The algorithms are developed mainly based on the project SculptGL by Stéphane Ginier [link].

Data Structure
Octree: for speeding up intersection test. [link]
Half-Edge: for speeding up subdivision. [link]