

Shape Space Exploration of Constrained Meshes

This is a very short manual for demo program: *2D/3D exploration, deformation and reduced/Intrinsic exploration*. We include the Windows installer. The software has been tested on (Intel x86) machines with 32bit windows XP, windows Vista and Windows 7 operating systems.

RUNNING THE PROGRAM

Step 0: Installation.

Run the installer and follow the instructions. Once installation is complete, please ensure that the directory “bin” and “PQ_Evolution_TestCases” have been created, which include the executable files and data files, respectively.

Step 1: 2D/3D exploration.

- Select model: drop box (Six/Yas Island)
- Select dimension of subspace: radio button (2D/3D)
- Select test case: radio button (Case 1/Case 2)
- Load data: load button

[2D exploration]

Explore in 2D:

- Select handle (red dot): left mouse button
- Move handle: press left mouse and move
- Exploration option: Osculant (default) or Tangent (sub-optimal, only for comparison)

2D sampling:

- Generate initial sample: “Gen sample” button
- Optimize sample: “1 step”/ “10 step” button
- Navigate sample: spin box

[3D exploration]

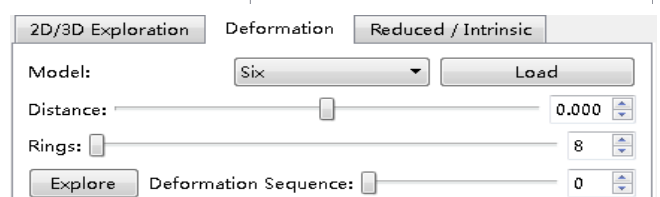
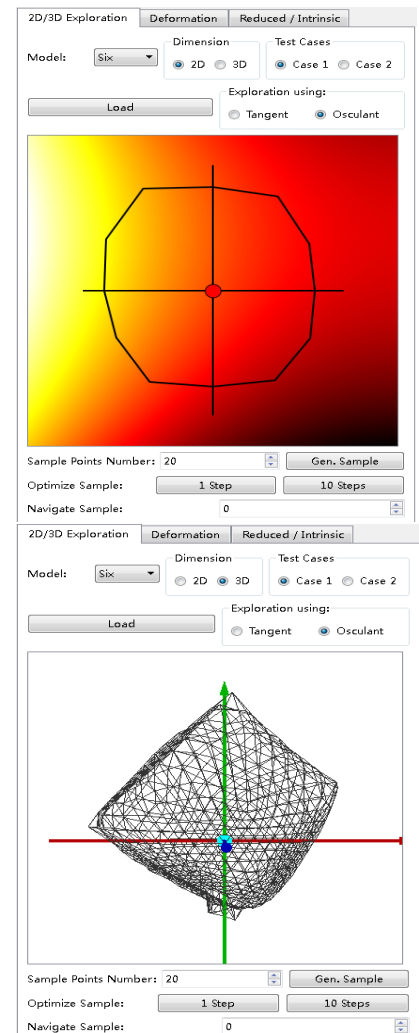
Explore in 3D:

- Select handle (cyan sphere): ALT + left mouse button
- Moving handle: ALT + left mouse button + mouse move
- Exploration option: (refer to 2D, osculant/tangent)

3D sampling: (refer to 2D), you can also pick the samples directly

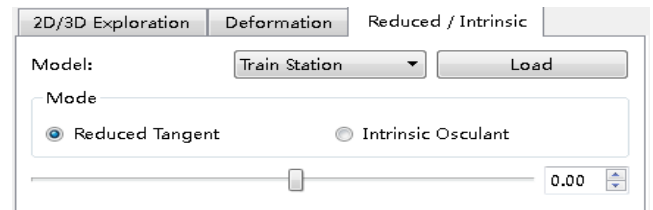
Step 2: Deformation.

- Load the model.
- Select a vertex: SHIFT + left mouse button
- Select the offset distance: slider control
- Select the neighborhood rings: slider control
- Compute deformation: “Explore” button
- View deformation sequence: slider control



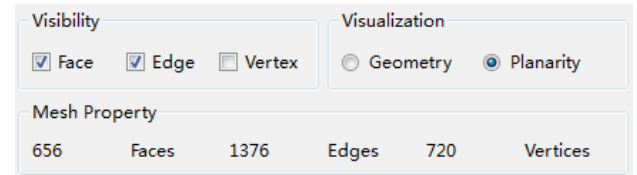
Step 3: Reduced / Intrinsic

- Load the model (Train Station).
- Select exploration option: radio button (Reduced Tangent/Intrinsic Osculant)
- Select the displacement distance: slider control (refer to Figure 8 in the paper)



Rendering and visualization settings.

- Viewing mesh elements: Visibility group box (Face/Edge/Vertex)
- Visualizing mesh properties: Visualization group box (Geometry/Planarity, in Planarity mode, red face indicates its planarity deviation is over tolerance)



Keyboard and mouse settings.

- select a mesh vertex: shift + left mouse click
- scale mesh in scene: middle mouse scroll
- rotate mesh in scene: left mouse button + mouse move
- translate mesh in scene: shift + left mouse press move

Uninstall

Please go to “Control Panel -> Add or Remove Programs” to uninstall the program.

Final words.

We hope that this application helps in better judging the algorithm steps, its performance. We include three models (Six, Yas Island and Train Station) presented in the paper. Have fun with PQ Mesh exploration!

(You may also refer to video for interaction of GUI. Thanks!)