

Problem 13. Write a Matlab function `[V, T] = readobj(filename)` that returns the vertex set V and face set T stored in the OBJ file with name `filename`.

- Useful Matlab functions: `fopen`, `frewind`, `fclose`, `fgets`, `strtok`, `sscanf`
- OBJ file format reference can be found here:

https://en.wikipedia.org/wiki/Wavefront_.obj_file

Example files will never use vertex normals or texture coordinates, so please ignore that part.

Display the triangle mesh using `trimesh` or `trisurf`.

Problem 14. Write a Matlab function that computes the Tutte embedding of a disk-like triangle mesh.

- You will need to identify the boundary vertices of the mesh.
- When writing down the linear system it is helpful to have a vertex list

$$V = (v_1, \dots, v_n, v_{n+1}, \dots, v_N)$$

such that the first n vertices are the interior vertices and the last $N - n$ vertices form a closed boundary loop.

Example meshes are provided in TISS.

Problem 15. Implement an algorithm to minimize the surface area of a triangle mesh (with fixed boundary, if any):

- Compute the mean curvature vector at mesh vertices. Visualize the resulting vector field.
- Formulate a gradient descent based algorithm to minimize surface area and implement it in Matlab.

Input triangle meshes can be found in TISS.