

Programming # 3*due: 4-4***Barycentric coordinates**

Implement the two methods for barycentric coordinates that we discussed in class. Use a regular 2D polygon, with vertices

$$\mathbf{p}_i = \left[\cos\left(\frac{2i\pi}{n}\right), \sin\left(\frac{2i\pi}{n}\right) \right].$$

You will need two functions with input n (no. of polygon vertices), a point \mathbf{x} inside the polygon, and with output u_1, \dots, u_n , where the u_i are the barycentric coordinates of the point \mathbf{x} .

You then need to compare the two methods. Some suggestions:

1. Focus on vertex 1. Plot isolines $u_1 = c$ for some c -values between 0 and 1. For this, you might want to use a dense triangulation of your polygon.
2. Plot some lines of the form $\mathbf{u}(t) = (1 - t)\mathbf{u}_1 + t\mathbf{u}_2$, where \mathbf{u}_i are barycentric coordinates of two points. You might need 3D views for this option; the first one needs only a 2D top view.