

Math 3890, Machine Problem 9: Due Tu., 10/29/19

- 1) Write a script to find a Powell-Sabin spline that interpolates Hermite data at the vertices of a triangulation with a hole. The script should
 - a) prompt for a file name and read three integers $n, n1, n2$ from the file
 - b) read vectors x, y, z, zx, zy from the file. They should all be of length n
 - c) assume the first $n1$ points in (x, y) define the outside boundary of the domain, in counterclockwise order
 - d) assume the next $n2$ points in (x, y) define the boundary of the hole, in counterclockwise order
 - e) Create a constraint matrix `Con` of size $(n1 + n2) \times 2$ to force delaunay to have the desired boundaries
 - f) run `DT = delaunayTriangulation([x,y],Con)` to create an object `DT` containing the triangulation. Use `I0 = isInterior(DT); TRI = DT(I0,:)` to extract the desired triangulation.
 - g) plot this triangulation. Mark the outside boundary points with red dots, and the inside boundary points with blue dots
 - h) Call `trilists` and `ps` to create a Powell-Sabin refinement of this triangulation, and to find the coefficient vector c of the spline interpolating the values and the derivatives D_x, D_y at each of the n vertices of the original triangulation.
 - i) print the first 10 coefficients
 - j) plot the Powell-Sabin triangulation
 - k) Call `c1ck` to make sure your spline is C^1
 - l) Call `valspDP` with `m = 5` to create a set of facets that can be displayed with `trimesh`. Plot the spline using these points
- 2) Run your code with the data file `mp9.dat` posted with this problem. I am also posting an updated `ps.p` – you should replace the one in the spline package by this one.
- 3) Turn in your script, the plots of the triangulations, and the plot of the spline.