Math 3890, Machine Problem 12: Due Tu., 4/13/21

1) Write a script `mp12pos` that reads a triangulation $\triangle_0$ of a set of points `xo,yo`. Set `zo = hill(xo,yo)` and find the coefficients of a spline in the Powell-Sabin space $\mathcal{S}_2^1(\triangle_{PS})$ that interpolates this data. You may use my functions `nmds` and `menps`.
   a) Evaluate this spline on a 71×71 grid and plot the spline.
   b) Use those grid values to find and print max and RMS errors.
   c) Find and print the minimal value of the spline on the grid.

2) Write a script `mp12mon` that reads a triangulation $\triangle_0$ of a set of points `xo,yo`. Set `zo = sigmoid(xo,yo)` and find the coefficients of a spline in the Powell-Sabin space $\mathcal{S}_2^1(\triangle_{PS})$ that interpolates this data. You may use my functions `nmds` and `menps`.
   a) Evaluate this spline on a 71×71 grid and plot the spline.
   b) Use those grid values to find and print max and RMS errors.
   c) Plot the derivative in the northeast direction on the same grid.
   d) Find and print the minimal value of this derivative on this grid.

3) Write a script `mp12con` that reads a triangulation $\triangle_0$ of a set of points `xo,yo`. Set `zo = conf(xo,yo)` and find the coefficients of a spline in the Powell-Sabin space $\mathcal{S}_2^1(\triangle_{PS})$ that interpolates this data. You may use my functions `nmds` and `menps`.
   a) Evaluate this spline on a 71×71 grid and plot the spline.
   b) Use those grid values to find and print max and RMS errors.
   c) Plot the 2nd derivative of the spline in the northeast direction on the same grid. You may use my function `valspdergridr` which evaluates the r-th directional derivative of a spline on a grid.
   d) Find and print the minimal value of this 2nd derivative on the grid.
   e) Run `conck` and print the resulting values.