Homework # 10, due Wed, Apr 27th.

1. Create a MATLAB routine that inputs the order of the spline space k, a knot sequence $\mathbf{t}$, a new knot x, a coefficient sequence a and outputs new sequences $\hat{\mathbf{t}}$ and $\hat{a}$ obtained after inserting x into the knot sequence, so that

$$\sum_j a(j) B_{j,k,\mathbf{t}} = \sum_j \hat{a}(j) B_{j,k,\hat{\mathbf{t}}}.$$

Run your program on the data $k = 4$, $\mathbf{t} = [0, 0, 1, 1.5, 2, 2.1, 2.2, 2.3, 3]$, $a = [1, -1, -0.5, 3, -1]$. If you have access to the Spline toolbox, use it only to check your results.

2. Create a MATLAB function for plotting the control polygon of a spline given its order k, knot sequence $\mathbf{t}$ and a coefficient sequence a. Run it with the same data as in Problem 1.

3. Create a MATLAB function for inserting knots into control polygons. Experiment inserting knots into the control polygon from Problem 2 to achieve a control polygon closely resembling the spline itself.