ESC 251 **HW 17** **Due: Oct. 19**

In the lecture we discovered that using the clamped spline resulted in more accuracy at the left end of the domain. This was possible because we are working with a known function and could therefore compute the exact derivative at the endpoints.

In a real situation, this would not be feasible. The tabulated function would not be known and some way of approximating the derivative at the endpoints of the domain would need to be devised.

For this assignment you will test out one technique for this.

1) Start by loading the data into MATLAB like in the scripts we wrote in class.

2) Generate the non-a-knot spline `T` as in the first script example.

3) Download the `sp_deriv.m` file from the course website and put it in your working directory. This function takes a spline structure as input and outputs a spline structure for the derivative of the spline. The syntax is

```
D = sp_deriv(T,1);
```

   where `T` is the original spline structure.

4) Use the `D` spline structure to estimate the slopes of `T` at the endpoints of the domain (*i.e.*, use `D` to get the values of `m1` and `m2` from the second script example).

5) Using these slopes, generate the clamped spline `TC`.

6) Use this new version of the clamped spline to repeat the last few steps of the second script.

7) How does the error at the left end of the domain change? Is it as good as when we use the exact derivatives, is the error the same size as for the non-a-kont spline or is the error somewhere in between these two?