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Numerical Methods

<p align="center">Homework #6</p>

1. $S(x)$ { $a + b(x-1) + c(x-1)^2 + d(x-1)^3$, $x \in [0, 1]$

   $(x-1)^3 + ex^2 - 1$, $x \in [1,2]$

   $S''(0) = 0 = 2c + 6d(x-1)$, $2c - d = 0$, **$2c = d$**

   $S''(2) = 0 = 6(x-1)+2e$, $6+2e = 0$, **$e = -3$**

   $a + b(x-1) + c(x-1)^2 + d(x-1)^3 = (x-1)^3 + ex^2 - 1$, where $x = 1$

   $a + 0 + 0 + 0 = 0 + e - 1$, $a = e - 1$, **$a = -4$**

   S': $b + 2c(x-1) + 3d(x-1)^2 = 3(x-1)^2 + 2ex$, $x = 1$

   $b = 2e$, **$b = -6$**

   S'': $2c + 6d(x-1) = 6(x-1)+2e$, $x = 1$

   $2c = 2e$, $e = c$, **$c = -3$…. $d = -6$**

   <u>Answer: a = -4, b = -6, c = -3, d = -6, e = -3</u>

2. Code is called Spline3_Coef.m

   a. Output:

   ```
   >> Spline3_Coef(n, t, y)
   ans =

    Columns 1 through 5:

        0.00000    -2.69020    4.67890    -3.24794    0.41140

    Columns 6 through 10:

       -0.43606    0.76184   -15.30301    15.06060    0.00000
   ```

   b.

   c. I couldn't figure out how to plot this in a useful way.