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(12 pts) For this assignment, you will need to load the data from the file `data.dat` into MATLAB so you can use it. When you download the file make sure your browser does not alter the filename. Also, make sure the data file is in the same directory as your MATLAB working directory.

From a script file, enter the following:

```
load data.dat;  
x = data(:,1);  
y = data(:,2);
```

This will load the data from the file into a table of values for some function  $y = f(x)$ .

- 1) Use the routines we wrote in class to estimate the value of  $y$  for the set of  $x$  values

$$x = -2.05, -1.06, 0.42, 0.93, 1.05, 1.21, 1.96.$$

- 2) The function in the table is

$$y = x^2 \sin(x) - x \cos(x).$$

For each value of  $x$  in the list above, compute the relative error in the corresponding value of  $y$ . Use the formula

$$\text{Relative Error} = \frac{\text{approximate} - \text{exact}}{\text{exact}}.$$

- 3) Display your interpolation results in a simple table. To do this, create a matrix of  $x$ , the approximate  $y$  value, the exact  $y$  value and the relative error, then display this matrix.
- 4) Plot the data in the table using a solid black line (no symbol markers). On the same set of axes, plot the interpolated data points using red circles (no connecting line).