Homework Assignment 1 Due on Tuesday 10/2

Writing Problems:

1. Do the following exercise problems in the text book by Bradie,

Sec 1.2: 1(b*,c), 2(c*,d), 3*, 4*, 7*, 11*, 15*

Sec 1.3: 1(c), 2, 3*, 12

Sec 1.4: 1(a), 7*, 13

2*. Suppose f(x) is twice differentialable and f''(x) is uniformly bounded, i.e., |f''(x)| < M for some positive constant M. Show that for any fix number a, we have

$$f'(a) = \frac{f(a+h) - f(a)}{h} + O(h)$$

Hint: Use Taylor expansion on f(a+h).

We only discuss * problems in discussion section.

Coding Problems:

1. Copy the following code on Matlab to see what happens. %% Code starts here

 $\begin{array}{l} s=0\\ for \ i=1{:}10\\ s=s{+}i\\ end\\ \%\% \ Code \ ends \ here \end{array}$

(a) What does s mean in the code?

(b) How do you modify the code to compute $\sum_{i=1}^{5} i^{3}$?

(c) Modify the code to compute the answer for $\sum_{i=1}^{5} i^3$, $\sum_{i=1}^{2000} i^3$ and $\sum_{i=1}^{100000} i^3$. Compare the results with the formula

$$\sum_{i=1}^{n} i^3 = \left(\frac{n(n+1)}{2}\right)^2$$

Are the answers computed by two different methods the same? If not, why?