ENGR 250 Numerical Methods using MATLAB
2015 Winter Quarter

Homework Assignment #5

Due : March 4th (Wednesday)

You should submit your M-file, named **HW7_*yourEmailAccount***, by email "pandrist@greenriver.edu" before the due date - March 4th at 1:00 PM

1. Differentiation Find the following derivatives of $f(x) = cos(x)sin(x)$ evaluated on $x \in [0, 2\pi], \Delta x = 0.01$:

- First derivative using $O(\Delta x^2)$ accurate scheme. Save on **HW5_1.dat**
- Second derivative using $O(\Delta x^2)$ accurate scheme. Save on **HW5_2.dat**
- First derivative using $O(\Delta x^4)$ accurate scheme. Save on **HW5_3.dat**

2. Integration

Evaluate the following integral

$$\int_0^{\pi} (8 + 5\cos x)\, dx$$

with your own trapezoid rule function or script

- with one region - will require 2 total data points. Save on**HW5_4.dat** file
- with two regions - will require 3 total data points. Save on**HW5_5.dat** file
- with five regions - will require 6 total data points. Save on**HW5_6.dat** file

with your own Simpson's rule function or script,

- with one region - will require 3 total data points. Save on**HW5_7.dat** file
- with two regions - will require 5 total data points. Save on**HW5_8.dat** file
- with five regions - will require 11 total data points. Save on**HW5_9.dat** file

with your own Simpson's 3/8 rule function or script,

- with one region - will require 4 total data points. Save on**HW5_10.dat** file

- with two regions - will require 7 total data points. Save on**HW5_11.dat** file

- with five regions - will require 16 total data points. Save on**HW5_12.dat** file

3. Integration : MatLab Commands

Use the MatLab commands 'trapz' and 'quad' to evaluate integrals. The normal distribution is defined as

$$f(x) = \frac{1}{\sqrt{2\pi}} e^{-x^2/2}$$

With 'trapz' command, make following dat files and submit them.

- save the integration $-1 \leq x \leq 1$ and $\Delta x = 0.05$ on **HW5_13.dat** file

- save the integration $-2 \leq x \leq 2$ and $\Delta x = 0.05$ on **HW5_14.dat** file

With 'quad' command, make following dat files and submit them.

- save the integration $-1 \leq x \leq 1$ on **HW5_15.dat** file

- save the integration $-2 \leq x \leq 2$ on **HW5_16.dat** file

With 'quadl' command, make following dat files and submit them.

- save the integration $-1 \leq x \leq 1$ on **HW5_17.dat** file

- save the integration $-2 \leq x \leq 2$ on **HW5_18.dat** file