Math 321

Assignment # 2

Due: Nov 23, 2014

Instructions: You need to

1- **submit** a hardcopy of your codes and results

2- **send** me your m-files (write your name in first line of each file. i.e. %Said Algarni).

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1. **Write** a MATLAB code that will **plot** $P_2(x)$, $P_{10}(x), P_{100}(x)$ of the constructed Lagrange interpolating polynomials for the function $f(x) = e^{2x}\cos 3x$ on the interval $[x_0 = 0, x_n = 0.6]$. (using equally spaced nodes) Then, **plot** (in one figure) x versus the absolute error of each polynomial.

2. (a) Let $f(x) = e^{2x}\cos 3x$ on [0, 2]. **Write** a MATLAB code that will plot the derivative of $f(x)$ using the following approximations (without the error term):
   i. Forward-difference formula; Eq. (4.1)
   ii. Three –point formula; Eq. (4.4)
   iii. Five-point formula; Eq. (4.6).

   (b) Now, **write** another MATLAB code to approximate $f'(0)$ (using i, ii and iii) with different values of h, say $h \in [0.01,1]$. Use the **loglog** command to **plot** h versus the relative error of each approximation.

3. Coming soon on the integration.