

Numerical Methods  
MAT/CSC 381  
Project 03

Develop code to produce the Lagrange interpolating polynomials of degree 1 and 2 to approximate  $f(0.45)$  for the 4 equations in Problem 1, Exercise Set 3.2.

Create a report that

- a) describes your code
- b) graphs the equations and P1 and P2 interpolation polynomials
- c) and describes the approximation error of each result (compared to the exact answer).

For the given function  $f(x)$ , let  $x_0 = 0$ ,  $x_1 = 0.6$ , and  $x_2 = 0.9$ .

- 1a.  $f(x) = \cos x$
- 1b.  $f(x) = \sqrt{1+x}$
- 1c.  $f(x) = \ln(x+1)$
- 1d.  $f(x) = \tan x$

Hint: Construct a Lagrange code function

```
function [retval] = lagrange(n, x_interp, xn, yn)
% n is the degree of the Lagrange polynomials
% x_interp is the x-value for interpolation
% xn[] is the array of data points
% yn[] is the array of function values at the data points
```