Homework 11 :: MATH 504 :: Due Monday Nov 28th, 11:59 pm

Your homework submission must be a single pdf called "LASTNAME-hw5.pdf" with your solutions to all theory problem to receive full credit. All answers must be typed in Latex.

1. Find the quadratic polynomial $p_2(x)$ that interpolates the data

x	1	2	4
y	-1	-1	2

   a. using the Lagrange method;

   b. using the method of undetermined coefficients.

2. Add the data point $(x_3, y_3) = (6, 1)$ to the table in the problem 1.

   a. Use Newton's method to find the cubic interpolating polynomial $p_3(x)$ for the resulting data.

   b. Find $p_3(x)$ using the Lagrange method.

3. Find the trigonometric function

$$T(x) = a_0 + a_1 \sin x + a_2 \sin 2x$$

   that interpolates the following data.

x	0	$\pi/2$	$\pi/3$
y	-1	2	1

4. Find the quartic interpolating polynomial $p_4(x)$ for $f(x) = e^{3x}$ using $x_0 = -1$, $x_1 = -0.5$, $x_2 = 0$, $x_3 = 0.5$, and $x_4 = 1$. For $x = 0.8$

   a. compute $e_4(x) = f(x) - p_4(x)$;

   b. estimate the error $e_4(x)$ using the bound formula given in the lecture.