

Scientific Computations CS 315 Assignment 2

Total Marks: 7 Marks

Due on Sunday, December 13, 2015

Dr. Kareem Elgindy

Question 1 (1 mark)

Answer true or false:

Extrapolation is the estimation of intermediate values between data points when they exhibit a significant degree of error or scatter.

Question 2 (2 marks)

Which of the following gives the approximate linear least squares polynomial for the data in the table below?

i	x_i	y_i
1	0	1.0000
2	0.25	1.2840
3	0.50	1.6487
4	0.75	2.1170
5	1.00	2.7183

(i) $1.136x + 1$.

(ii) $1.2974x + 1$.

(iii) $1.70784x + 0.89968$.

Question 3 (2 marks)

Apply two iterations only of Newton's method to find an approximate root of the equation,

$$f(x) = -x^3 - \cos x = 0,$$

using the initial guess $p_0 = -1$. Could $p_0 = 0$ be used? Why?

Question 4 (2 marks)

Let $P_1(x)$ be the linear interpolating polynomial for the data points $(0, 0)$ and $(0.5, y)$, and suppose that the coefficient of x in $P_1(x)$ is 10. Find y .