MAT 116E Advanced Scientific and Engineering Computing

Lab-12 / CRN : 12852

Instructor: Assoc. Prof. Dr. Burcu Tunga — Lab Assistant: Res. Asst. Ahmet Topal

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1 Question 1

Data points on the table, which are points of the function $f(x) = 1.5^x \cos(2x)$, are given. Use **linear, spline**, and **pchip** interpolation methods to calculate the value of y between the points. Make a figure for each of the interpolation methods. In the figure show the points, a plot of the function, and a curve that corresponds to the interpolation methods.

x	0	1	2	3	4	5
y	1.0	-0.6242	-1.4707	3.2406	-0.7366	-6.3717

2 Question 2

It was suggested one can make a pretty good prediction of how a student will do in a class based on their performance on the first two homework assignments. For 10 students from a class, the following data was given.

HW1	13.5	13.0	14.5	13.0	18.5	19.5	16.5	12.0	18.5	16.0
HW2	17.75	8.00	15.25	14.5	17.25	14.5	12.75	15.25	15.75	15.75
FINAL	80.60	66.3	54.3	76.5	86.0	77.6	84.1	81.4	81.9	91.2

Use a linear least squares regression to approximate the final grade in terms of the first two homework grades. In other words, if f is the final grade, x is the first homework score and y is the second homework score, find a, b, and c so that $a + bx + cy$ is the best fit to f in the sense of least squares. Use this to predict the final grade for a student who gets a 17 and a 16.75 on the first two assignments.
(Show all your calculations.)