

MATH.2720 Introduction to Programming with MATLAB
Homework on Statistics, Polynomials, and Curve Fitting (Due 4/13)

Please email your script files and function files to me at `stephen_pennell@uml.edu`

1. Create a script file that reads the data in the file `HW8a.xlsx` on the course web page (<http://faculty.uml.edu/spennell/Teaching/MATLAB/HW8a.xlsx>) and calculates the mean, median, and standard deviation of the data.
2. Create a script file that reads the data in the file `HW8b.xlsx` on the course web page (<http://faculty.uml.edu/spennell/Teaching/MATLAB/HW8b.xlsx>) and calculates a cubic spline passing through the data points.
Plot the data points using markers and plot the spline function using a solid line.
Calculate the value of the spline function at $x = 0.5$.
3. (From Gilat, *MATLAB: An Introduction with Applications*) Write a user-defined function that adds or subtracts two polynomials of any order. Name the function `p=polyadd(p1,p2,operation)`. The first two input arguments `p1` and `p2` are the vectors of the coefficients of the two polynomials. (If the two polynomials are not of the same order, the function adds the necessary zero elements to the shorter vector.) The third input argument `operation` is a string that can be either `add` or `sub`, for adding or subtracting the polynomials, respectively. The output argument is the resulting polynomial.
Use your function to add and subtract the following polynomials:
 $f(x) = x^5 - 7x^4 + 11x^3 - 4x^2 - 5x - 2$ and $g(x) = 9x^2 - 10x + 6$.
4. (From Gilat, *MATLAB: An Introduction with Applications*) Write a user-defined function that fits data points to a power function of the form $y = bx^m$. Name the function `[b,m] = powerfit(x,y)`, where the input arguments `x` and `y` are vectors with the coordinates of the data points, and the output arguments `b` and `m` are the constants of the fitted exponential equation. Use `powerfit` to fit the data below. Make a plot that shows the data points and the function.

x	0.5	2.4	3.2	4.9	6.5	7.8
y	0.8	9.3	37.9	68.2	155	198