IAM 550 Introduction to Engineering Computing
Computer Lab 8
Loops redux, Linear fit
J. Raeder, October 22/24

Objectives:

- Understand for loops
- Understand arrays and indexing
- Compute sums both with loops and with array syntax.
- Use simple linear fit

Deliverables **due no later than 2 days after the end of your lab session:**

A MATLAB diary for your laboratory session (25% of your laboratory grade). This should be submitted via blackboard as an assignment no later than 2 days after your lab.

Deliverables **due at the beginning of your next lab session (October 29 or 31):**

- A lab hard-copy report summarizing your results and including all required files (scripts, plots), but **not any data files**. Make sure your name is on *all* pages of your lab report. Document your script profusely with comments. This will be emphasized when grading.

Task 1 of 3

Write a script lab08_a.m that first creates a vector `X` with `N=101` equally spaced values from -25 to 25. Use a for loop to create a set of simulated measurements according to `Y(i)=-10+0.2*x(i)+randn` where `i` is the loop index. The `randn` function returns a normally distributed random number that adds some typical measurement noise. Create a scatter plot (Figure 1) of X versus Y (no line, just symbols).

Task 2 of 3

Extend the script to calculate the coefficients `A0` and `A1` for a line fit (see lec13.pdf, page 15). Use a for loop to calculate the sums (even if you know a more efficient way). Add the line defined by `A0` and `A1` to the plot (Figure 2). Run the code with `N=1001` and `N=10001`. Discuss how the results change.

Task 2 of 3 (not required, 50 extra points)

Copy lab08_a.m to lab08_b.m and replace all loops with the corresponding vector statements. That code should produce Figure 3, which must look exactly like Figure 2.