

GEO 5500 Numerical Methods in the Geosciences
Computer Assignment #2:
Floating point arithmetic and errors

Assigned: January 20, 2005

Due: January 27, 2005

Reading: Lindfield and Penny, Chapter 1, Appendix 2

1. Create an m-file that progressively halves the distance between 0 and 1 (i.e., one half of 1 is 1/2, a half of 1/2 is 1/4, and so on). Determine the number of times you must repeat the procedure before program says that the larger number is also 0. Use a "while" statement to determine the smallest number that can be added to 1 so that the computer thinks the sum is something other than 1. Use the input statement to progressive halve the distance between 0 and 100. Is there any difference? Explain why or why not in the documentation of the program.
2. Calculate and plot the two equivalent functions given below at the intervals [0.9 - 1.1], [.99 - 1.01], [.992 - 1.008], [.993 - 1.007], [.995 - 1.005], and [.997 - 1.003]. (These can best be seen using the subplot command.) An example of what the plots should look like is given below.

$$f(x) = (x - 1)^6$$

$$f(x) = x^6 - 6x^5 + 15x^4 - 20x^3 + 15x^2 - 6x + 1$$

In the documentation for this program provide a short explanation of why the plots of the two programs are different.

