

## Assignment #2

**Due Tuesday, 10 September 2018, at the start of class**

Make sure you have a copy of the textbook.<sup>1</sup> Read as much of Chapter 4 as you can, especially sections 4.1, 4.2, and 4.3. While bisection may be new to you, you were introduced to Taylor's theorem and Newton's method in calculus.

Remember that when you turn in homework problems involving MATLAB (or OCTAVE), the following two expectations will always apply:

1. The commands that you used must be shown, along with the results.
2. Please strive to minimize use of paper: edit your result to remove extra space *but* keep a clear distinction between your m-files, your input commands, and the computed results.

**Do the following exercises:**

### CHAPTER 4

- Exercise A. Consider applying bisection to  $f(x) = x^2 - 2$ , using an initial bracket  $[1, 2]$ , to approximate  $\sqrt{2}$  to within  $10^{-2}$ . How many steps are needed? Now run the algorithm *by hand*, reporting each bracket. (You can use a hand calculator, of course, but don't write or run a MATLAB program.)
- Exercise 2(a) on page 102. (Start by plotting the function as requested. Then you may write your own code or use one that was written in class. See the course webpage [bueler.github.io/M310F19/](https://github.com/bueler/M310F19).)
- Exercise 1 on page 102. (Hint for (d): See section 4.3.)
- Exercise 3 on page 103.
- Exercise 4 on page 103.
- Exercise 6 on page 103.
- Exercise 7 on page 103.

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<sup>1</sup>Greenbaum & Chartier, *Numerical Methods: Design, Analysis, and Computer Implementation of Algorithms*, Princeton University Press 2012).