

University of Toronto Mississauga
Department of Mathematical and Computational Sciences
CSC 338 - Numerical Methods, Spring 2009

Assignment 4

Due date: Tuesday April 7, 12:10pm, at the start of tutorial.
No late assignments will be accepted.

Note: The material you hand in should be legible (either typed or *neatly* hand-written), well-organized and easy to mark, including the use of good English. All computer programs should be handed in and should be well commented. In general, short, simple answers are worth more than long, complicated ones. Unless stated otherwise, all answers should be justified.

If you do not know the answer to a question, and you write “I don’t know”, you will receive 20% of the marks of that question. If you just leave a question blank with no such statement, you get 0 marks for that question.

1. The following exercises are to be done by hand.
 - (a) Question **5.9** on page 246
 - (b) Question **5.5** on page 248.
 - (c) Question **5.6** on page 249.
 - (d) Question **5.12** on page 249.
 - (e) Question **6.4** on page 301.

2. (37 points total) The following computer problems are to be done using Matlab or Octave. For each question, hand in your program code and a transcript of a terminal session demonstrating that your programs work correctly. Be sure to indicate clearly which questions the programs and the transcripts refer to. (Note: some paper-and-pencil exercises are included.)
- (a) Question **5.1** on page 250. Use the Matlab function `fzero` to find the zeros of the function. For one of the zeros, set the `Display` option of `fzero` to `iter`, to display output at each iteration.
 - (b) Question **5.2** on page 250. In part (b), plot a log-error curve for each of the four fixpoint iterations; that is, plot $\log(e_k)$ vs. k . Generate a fifth plot that shows the log-error curves for all those fixpoint iterations that converge. Determine the constant C in those cases where the iteration converges linearly. In part (a), determine C analytically (mathematically), and in part (b), estimate C from the log-error curves. Do the two results agree?
 - (c) Question **5.15** on page 251. Use the Matlab function `fzero` where required (*i.e.*, unless a simpler method will do).
 - (d) Question **5.3** on page 250.

No more questions will be added.

University of Toronto Mississauga
Department of Mathematical and Computational Sciences
CSC 338 - Numerical Methods, Spring 2009

Cover sheet for Assignment 4

Complete this page and hand it in with your assignment.

Name: _____
(Underline your last name)

Student number: _____

I declare that the solutions to Assignment 3 that I have handed in are solely my own work, and they are in accordance with the University of Toronto Code of Behavior on Academic Matters.

Signature: _____