

MAE 3210 - Spring 2019 - Homework 4

Homework 4 is due **online** through Canvas in PDF format by 11:59PM on Wednesday February 27.

You are required to submit code for all functions and/or subroutines built to solve these problems, which is designed to be easy to read and understand, in your chosen programming language, **and which you have written yourself**. The text from your code should both be copied into a single PDF file submitted on canvas. **Your submitted PDF must also include responses to any assigned questions, which for problems requiring programming should be based on output from your code**. For example, if you are asked to find a numerical answer to a problem, the number itself should be included in your submission.

NOTE: For this homework you are welcome to solve problems 6 and/or 7 by hand, without using programming or submitting code. However, you are **required** to solve problems 1-5 with programming, and a copy of your code must be submitted.

Wednesday February 6 and Friday February 8 class:

1. Textbook problem 13.13
2. Textbook problem 13.15
3. Textbook problem 13.20

Monday February 11 and Wednesday February 20 class:

4. Textbook problem 14.9
5. Textbook problem 14.10
6. Find the gradient and Hessian for each of the following functions

(a) $f(x, y) = \ln(x^2 + 3xy + 2y^2)$.

(b) $f(x, y, z) = x^2 + y^2 + 3z^2$.

7. Given $f(x, y) = 2xy + 2y - 1.5x^2 - 2y^2$,
 - (a) Start with an initial guess of $(x_0, y_0) = (1, 1)$ and apply two iterations of the steepest ascent method to maximize $f(x, y)$.
 - (b) What point is the steepest ascent method converging towards? Justify your answer without computing any more iterations.