

Assignment #2

Due Wednesday, 12 September 2018, at the start of class

Make sure you have a copy of the textbook:

Griva, Nash, and Sofer, *Linear and Nonlinear Optimization*, 2nd ed., SIAM Press 2009.

Please read sections 2.1 through 2.4 and Appendices B.4 through B.8.

DO THE FOLLOWING EXERCISE from page 48:

- Exercise 2.8

DO THE FOLLOWING EXERCISES from pages 52–54:

- Exercise 3.1
- Exercise 3.3
- Exercise 3.13
- Exercise 3.18
- Exercise 3.19 (only do parts (iii)–(vii))
- Exercise 3.20

Problem P5. (This problem is related to Appendices B.4, B.6, B.7.) Consider the scalar-valued function

$$f(x_1, x_2) = \exp(-x_1^2 + 2x_1 - 3x_2 - x_2^2)$$

Compute the gradient and Hessian of f . Find the location where f is maximum.

Problem P6. (This problem is related to Appendix B.5. Carefully read about the relationship between the gradient of a vector-valued function and its Jacobian.) Consider the vector-valued function

$$f(x_1, x_2, x_3) = \begin{pmatrix} x_1^2 + x_2^2 + x_3^2 - 1 \\ x_2 - \arctan(x_1) \\ x_3^3 - x_3 - x_2 \end{pmatrix}$$

Compute the Jacobian of f .