Math 164-1: Optimization – Homework 9

Due: November 30, 2015

Exercise 1.

(1) Compute the inverse A^{-1} of the matrix

$$A = \left[\begin{array}{rrrr} 2 & 5 & 10\\ 1 & 1 & 1\\ -1 & -2 & -3 \end{array} \right]$$

using elementary row operations – Gaussian elimination – (i.e. exchanging rows, multiplying rows with scalars and adding scalar multiples of a row to another one). If you are not familiar with this, watch for instance the video https://www.youtube.com/watch?v=G1_8E4oEVII. Verify that $A^{-1}A = I_3$.

(2) Solve the linear system Ax = b using (similarly to the previous point) only elementary row operations, where

$$A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 4 & 2 & 3 & 1 \\ 5 & 1 & 5/2 & 3/2 \\ 2 & 1 & 2 & 1 \end{bmatrix} \text{ and } b = [1;4;0;3]^T.$$

Exercise 2.

- (1) Exercises 16.1 from the book of Chong and Zak.
- (2) Using the simplex algorithm, solve the (LP) from the Exercise 16.2 from the book of Chong and Zak (i.e. you do not have to answer the last two points, f) and g) of this problem, instead finish the simplex algorithm).

Exercise 3.

Exercises 16.3, 16.4 and 16.5 from the book of Chong and Zak.

Exercise 4.

Exercises 16.8 and 16.10 from the book of Chong and Zak.