Optimization Models in Finance
(Prof. Andrzej Ruszczyński)

HOMEWORK 4 *(due Tuesday, October 1, 2019)*

Problem 1

Consider the following linear programming problem:

$$\begin{aligned} \min \quad & 2x_1 + x_2 \\ \text{subject to} \quad & x_1 + 2x_2 \geq 4, \\ & x_1 + x_2 \geq 3, \\ & x_1 \geq 0,\ x_2 \geq 0. \end{aligned}$$

(i) Transform this problem to the standard form.
(ii) Find all feasible basic solutions.
(iii) Find the optimal solution and verify the conditions of optimality at this point.

Problem 2

Consider the linear programming problem from Problem 1 (in its original form). Formulate the dual problem and give its solution.

Problem 3

The matrix game has the payoff matrix

$$A = \begin{bmatrix} -2 & 1 \\ -3 & 3 \\ 4 & -3 \end{bmatrix}.$$

They represent the amounts that the column player (C) has to pay the row player (R).

Find the equilibrium in mixed strategies. Solve both primal and dual problems.