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December 11, 2015

# Optimization

## WS 2015/16

### Exercise 0

1. Consider the linear optimization problem:

$$\begin{array}{rrcrcl} \max & 2x_1 & + & 5x_2 & & \\ \text{w.r.t.} & x_1 & + & 2x_2 & \leq & 4 \\ & 4x_1 & + & 3x_2 & \leq & 12 \\ & & & 2x_2 & \leq & 3 \\ & x_1, & & x_2 & \geq & 0 \end{array}$$

   (a) Determine the feasible region.

   (b) Solve the optimization problem graphically.

   (c) Solve the problem for the new objective function $2x_1 + 4x_2$.

   (d) What do you notice?

2. Consider now this linear optimization problem:

$$\begin{array}{rrcrcl} \max & 2x_1 & + & 5x_2 & & \\ \text{w.r.t.} & x_1 & - & x_2 & \leq & -1 \\ & 2x_1 & + & 3x_2 & \leq & 12 \\ & & & x_2 & \leq & 2 \\ & & & x_1 & \geq & 0 \end{array}$$

   (a) Determine the feasible region.

   (b) Solve the optimization problem graphically.

   (c) What do you notice?

   (d) Transform the lp to the canonical form $\max\{c^T x \mid Ax = b, x \geq 0\}$.