

Optimization

WS 2016/17

Exercise 0

1. Consider the linear optimization problem:

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

- (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:

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

- (a) Determine the feasible region.
- (b) Solve the optimization problem graphically.
- (c) What do you notice?
- (d) Transform the lp to the canonical form $\max\{c^T x \mid Ax = b, x \geq 0\}$.