

Chapter 4

Linear Optimization (Graphical Method)

Solutions

4. 1.

Denote by

x_1 : the amount in Treasury note [in millions of dollars]

x_2 : the amount in bonds [in millions of dollars].

Hence, the amount in stocks [in millions of dollar] will be: $30 - (x_1 + x_2)$.

The model:

$$z = 0.07x_1 + 0.08x_2 + 0.09 \cdot (30 - (x_1 + x_2)) \rightarrow \max!$$

$$x_1, x_2 \geq 3$$

$$30 - (x_1 + x_2) \geq 3$$

$$x_1 + x_2 \geq 15$$

$$x_2 \leq 2x_1.$$

Therefore, we have:

$$z = 2.7 - 0.02x_1 - 0.01x_2 \rightarrow \max!$$

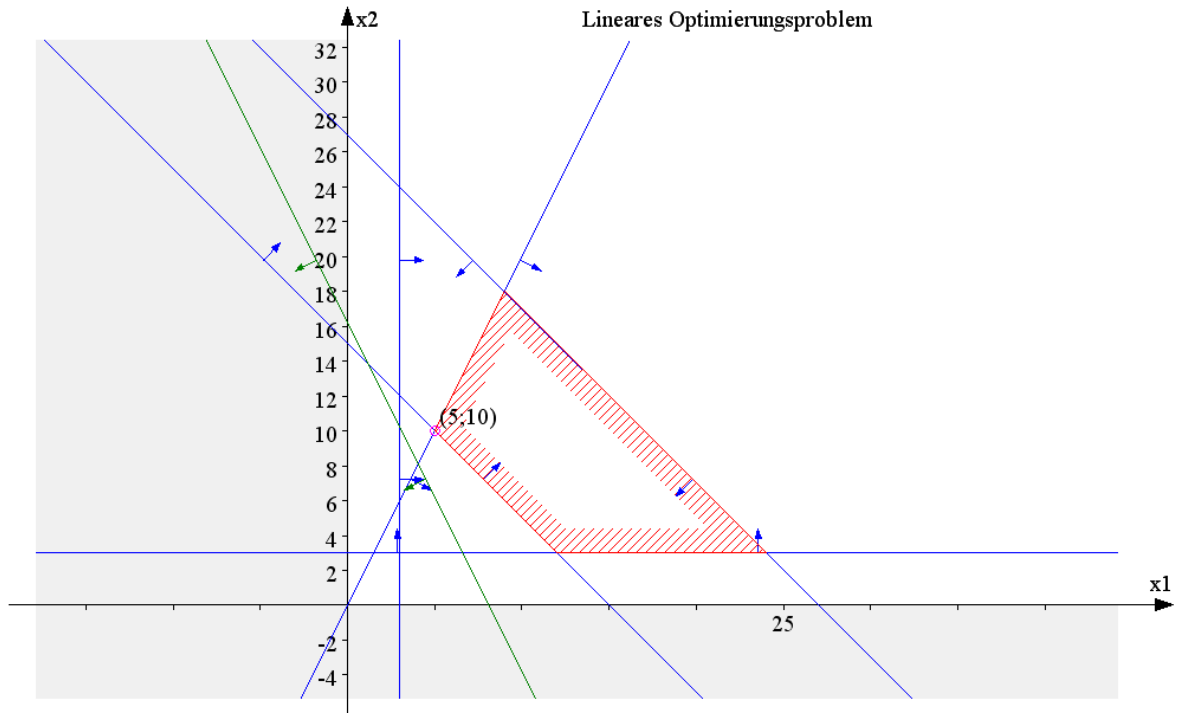
$$x_1 \geq 3$$

$$x_2 \geq 3$$

$$x_1 + x_2 \leq 27$$

$$x_1 + x_2 \geq 15$$

$$2x_1 - x_2 \geq 0.$$



$$x^* = (5 \ 10 \ 15)^T, \quad z^* = 2.5$$

4. 2.

1.
Let

x_1 : amount of potatoes

x_2 : amount of steak

The model

$$z = 25x_1 + 50x_2 \rightarrow \min!$$

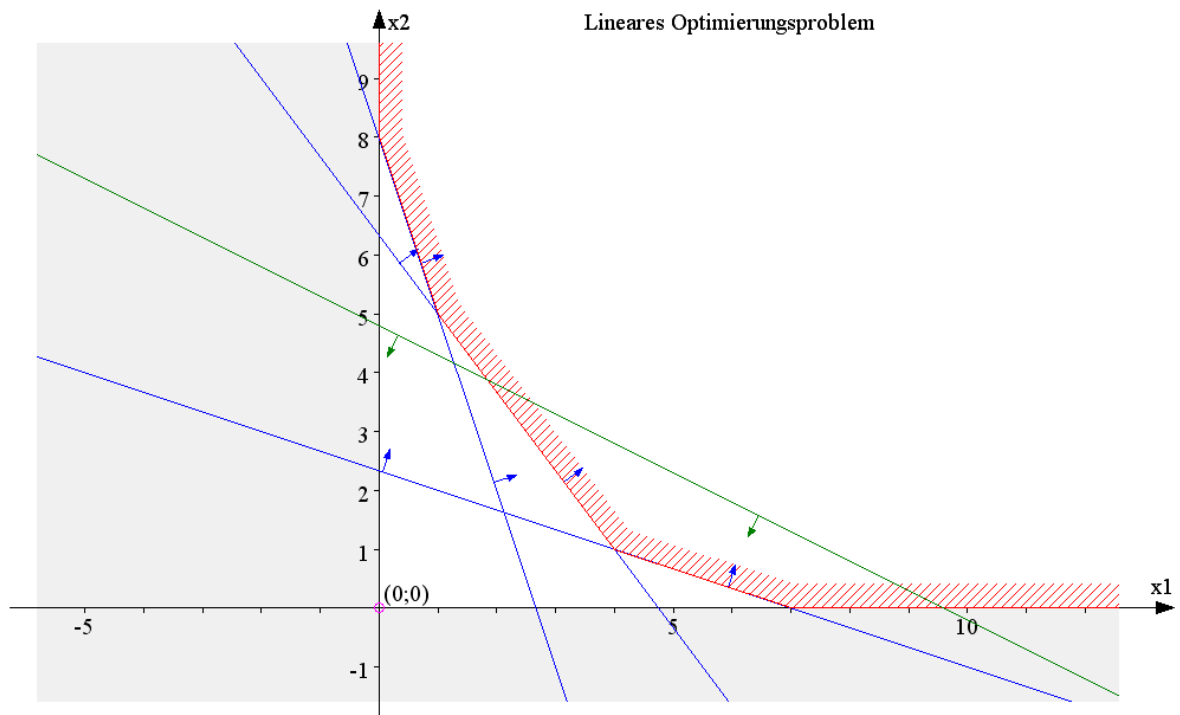
$$3x_1 + x_2 \geq 8$$

$$4x_1 + 3x_2 \geq 19$$

$$x_1 + 3x_2 \geq 7$$

$$x_1, x_2 \geq 0$$

2.



$$x^* = (4 \ 1)^T, \quad z^* = 150.$$

(Last updated: 22.06.2012)