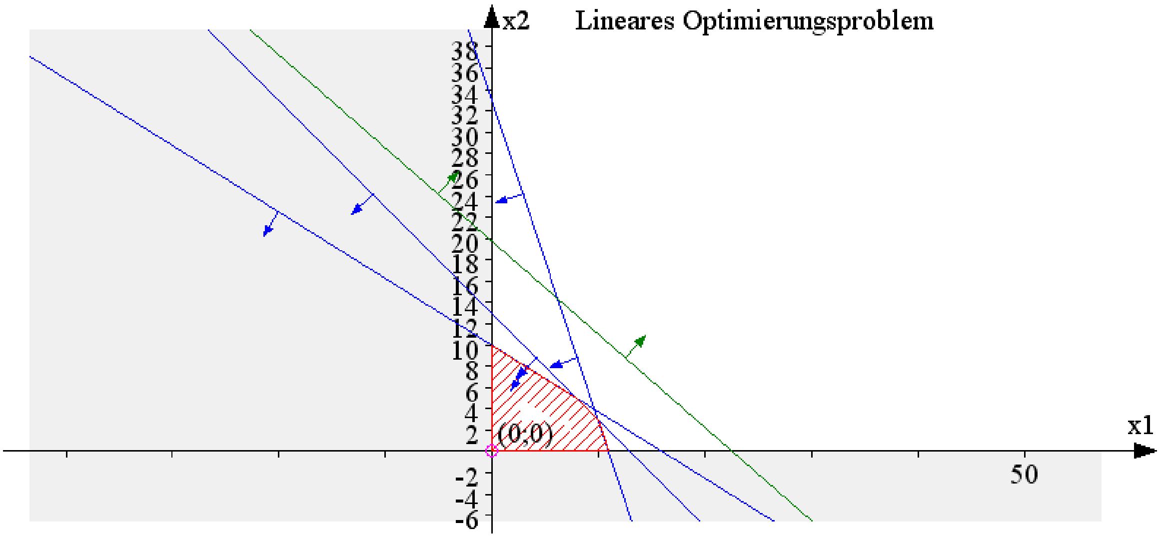
Kapitel 3

Lineare Optimierung
Graphische Lösung
Lösungen

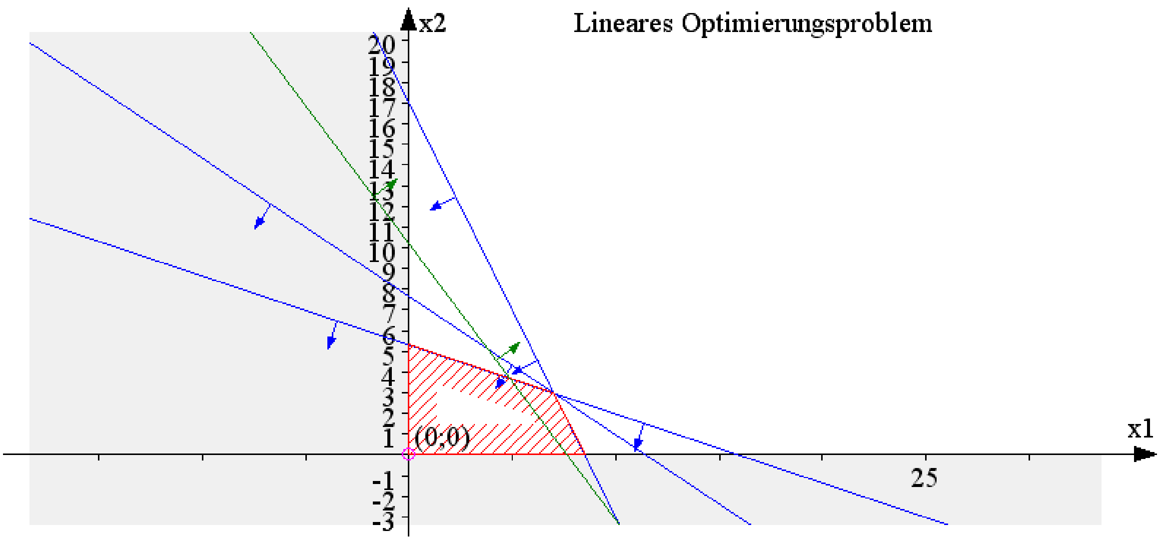
3. 1.

a)



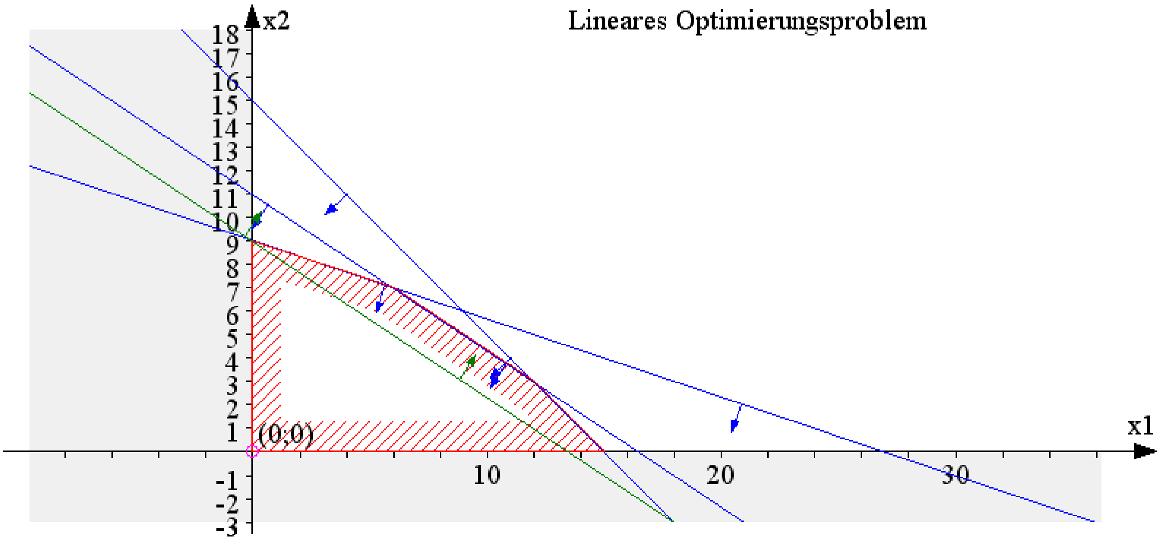
$$x^* = (8,\ 5)^T, \qquad z^* = 288$$

b)



$$x^* = (7,\ 3)^T, \qquad z^* = 370$$

c)



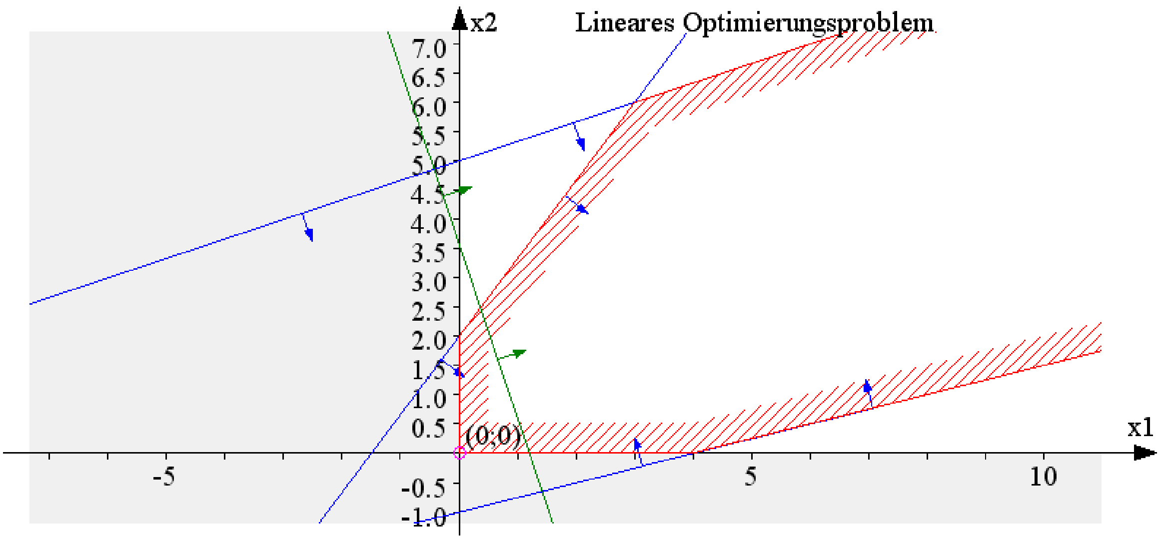
Mehrdeutige Lösung:

$$x^* = \alpha x^{*1} + (1-\alpha) x^{*2}, \quad 0 \le \alpha \le 1, \qquad z^* = 198,$$

mit

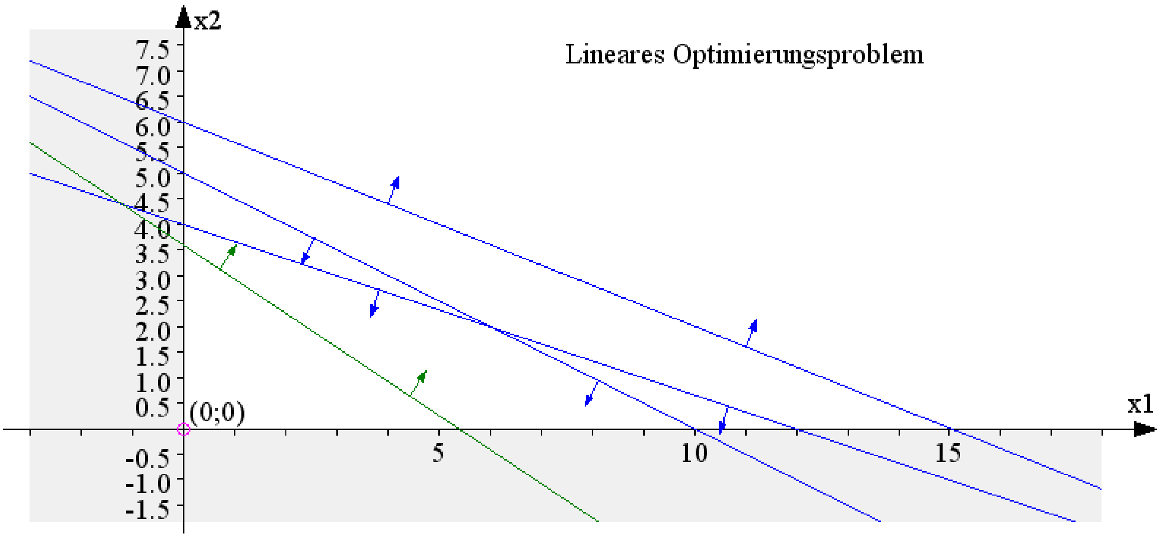
$$x^{*1} = (6 \quad 7)^T, \quad x^{*2} = (12 \quad 3)^T$$

d)



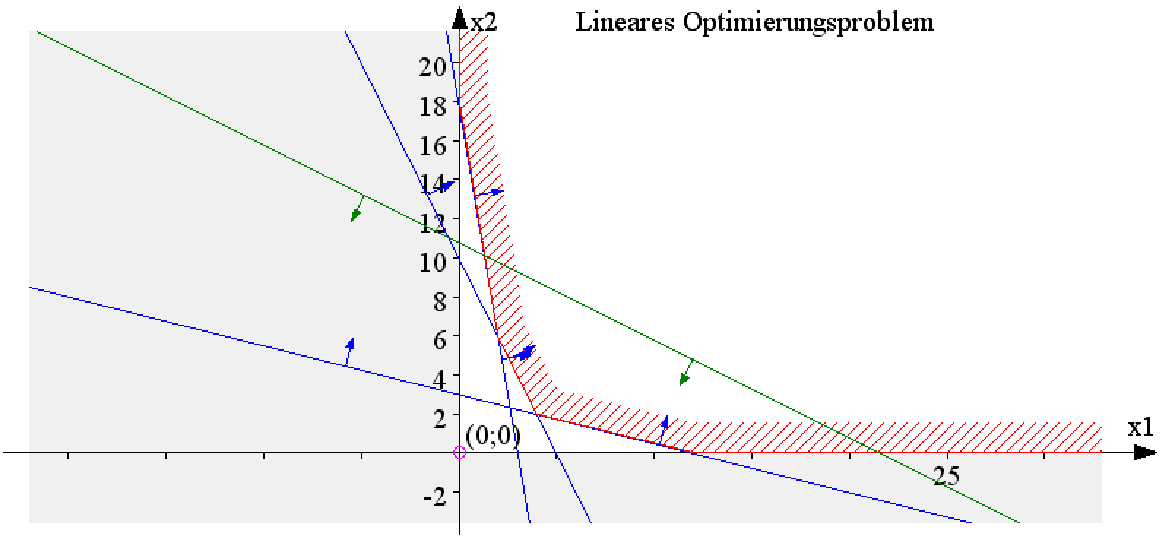
Die Zielfunktion ist auf der Menge der zulässigen Lösungen nicht beschränkt. Damit hat das Problem keine (endliche) Optimallösung.

e)



Das Problem hat keine zulässige und damit auch keine Optimallösung.

f)



$$x^* = (4,\ 2)^T, \qquad z^* = 160$$

3. 2.
Sei

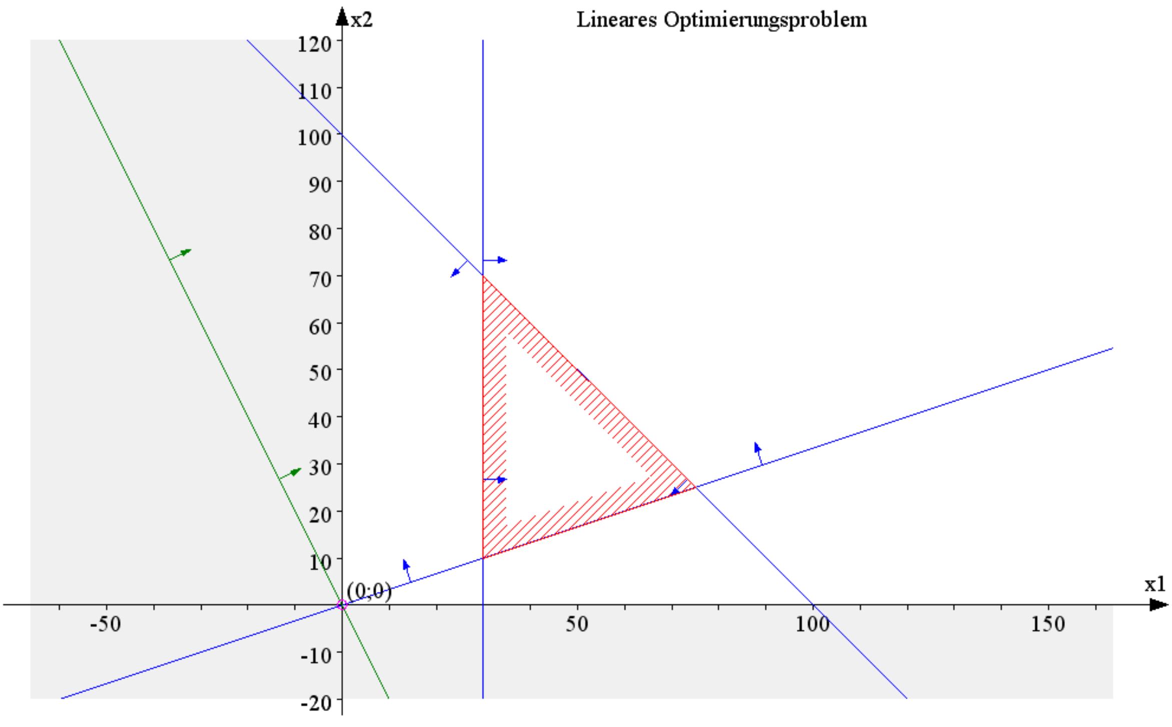
x_1 : Anleihen [Mio.]
x_2 : Wertpapiere [Mio.]

Das Modell:

$$z = 0.1x_1 + 0.05x_2 \to \max!$$
$$x_1 + x_2 \leq 100$$
$$x_2 \geq 0.25(x_1 + x_2)$$
$$x_1 \geq 30\,;\; x_2 \geq 0$$

bzw.

$$\begin{aligned} z = 0.1x_1 + 0.05x_2 &\to \max! \\ x_1 \qquad + x_2 &\leq 100 \\ 0.25x_1 - 0.75x_2 &\leq 0 \\ x_1 \geq 30\,,\, x_2 &\geq 0 \end{aligned}$$



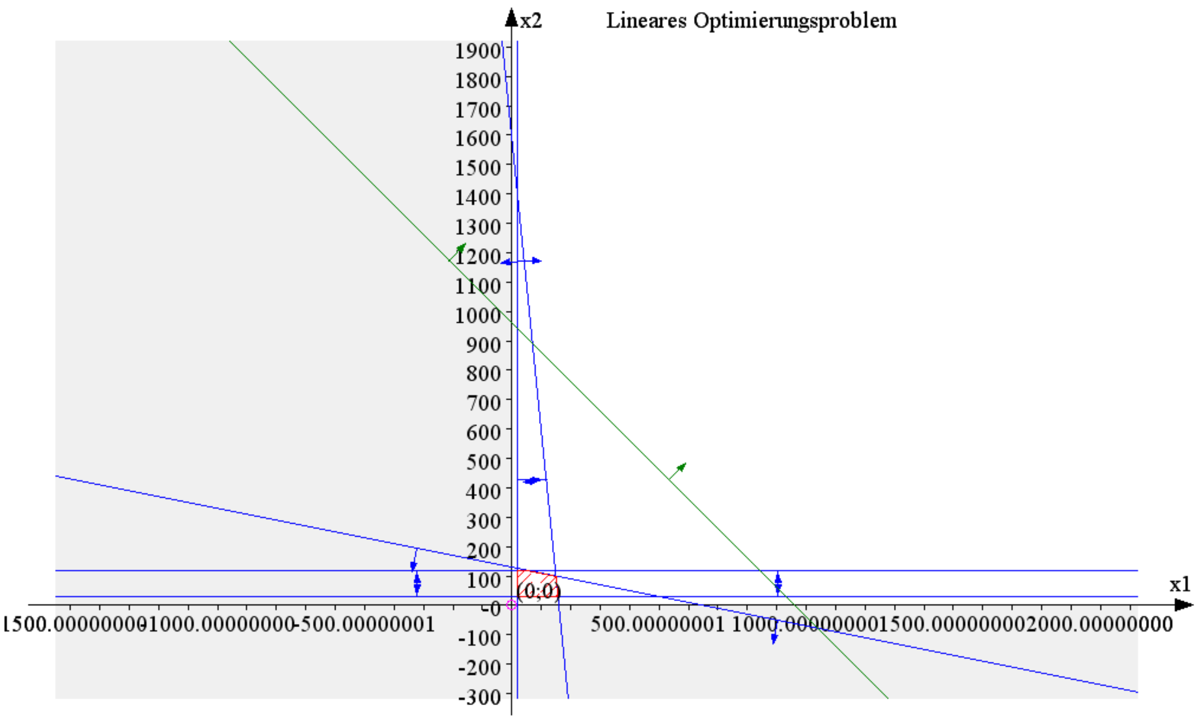
$$x^* = (75,\; 25)^T, \qquad z^* = 8.75$$

3. 3.
Sei

$x_i,\ i=1,2:$ Produktionsmenge P_i

Das Modell:

$$
\begin{aligned}
z = x_1 + x_2 &\rightarrow \max! \\
2x_1 + 10x_2 &\le 1300 \\
10x_1 + x_2 &\le 1600 \\
10x_2 &\le 1200 \\
x_1 &\ge 20 \\
x_2 &\ge 30
\end{aligned}
$$



$$x^* = (150,\ 100)^T, \qquad z^* = 250$$

(Letzte Aktualisierung: 14.06.2013)