

Решение ЗЛП графическим методом

Найти максимальное и минимальное значения функции при заданных ограничениях

1.

$$\begin{aligned} f(x_1, x_2) &= -x_1 - 4x_2 \\ x_1 &\leq 2, \quad x_1 + 2x_2 \geq 2, \\ x_2 &\leq 2, \quad x_1 + x_2 \leq 3, \\ x_1, x_2 &\geq 0. \end{aligned}$$

2.

$$\begin{aligned} f(x_1, x_2) &= -x_1 - x_2 \\ x_1 &\leq 3, \quad x_2 \leq 2, \\ x_1 + x_2 &\leq 1, \\ x_1, x_2 &\geq 0. \end{aligned}$$

3.

$$\begin{aligned} f(x_1, x_2) &= -2x_1 - x_2 \\ 2x_1 + x_2 &\geq 1, \quad 3x_1 - x_2 \geq -1, \\ x_1 - 4x_2 &\leq 2, \\ x_1, x_2 &\geq 0. \end{aligned}$$

4.

$$\begin{aligned} f(x_1, x_2) &= x_1 - 2x_2 \\ -x_1 + x_2 &\leq 0, \quad 2x_1 + x_2 \leq 3, \\ x_1 - x_2 &\leq 1, \\ x_1, x_2 &\geq 0. \end{aligned}$$

5.

$$\begin{aligned} F &= x_1 + x_2 \\ \begin{cases} x_1 + 2x_2 \leq 14, \\ -5x_1 + 3x_2 \leq 15, \\ 4x_1 + 6x_2 \geq 24, \\ x_1, x_2 \geq 0. \end{cases} \end{aligned}$$

6.

$$\begin{aligned} F &= -2x_1 + x_2 \\ \begin{cases} 3x_1 - 2x_2 \leq 12, \\ -x_1 + 2x_2 \leq 8, \\ 2x_1 + 3x_2 \geq 6, \\ x_1, x_2 \geq 0. \end{cases} \end{aligned}$$

7.

$$\begin{aligned} F &= x_1 + 2x_2 \\ \begin{cases} 4x_1 - 2x_2 \leq 12, \\ -x_1 + 3x_2 \leq 6, \\ 2x_1 + 4x_2 \geq 16, \\ x_1, x_2 \geq 0. \end{cases} \end{aligned}$$

8.

$$\begin{aligned} F &= -5x_1 + x_2 - x_3 \\ \begin{cases} 3x_1 - x_2 - x_3 = 4, \\ x_1 - x_2 + x_3 - x_4 = 1, \\ 2x_1 + x_2 + 2x_3 + x_5 = 7, \\ x_1, x_2, \dots, x_5 \geq 0. \end{cases} \end{aligned}$$

9.

$$\begin{aligned} F &= -5x_1 + x_2 - x_3 \\ \begin{cases} 3x_1 - x_2 - x_3 = 4, \\ x_1 - x_2 + x_3 - x_4 = 1, \\ 2x_1 + x_2 + 2x_3 + x_5 = 7, \\ x_1, x_2, \dots, x_5 \geq 0. \end{cases} \end{aligned}$$

10.

$$\begin{aligned} f(x) &= x_1 + 2x_2 - x_3 + x_4 \rightarrow \text{extr}, \\ x_1 + 2x_2 + x_4 &= 4, \\ x_1 + x_2 + x_3 &= 8, \\ x_1, x_2, x_3, x_4 &\geq 0. \end{aligned}$$

11.

$$\begin{aligned}
 f(x) &= -x_1 + 2x_2 - x_3 + x_4 \rightarrow \text{extr}, \\
 -x_1 + 2x_3 + x_4 &= 5, \\
 x_1 + x_2 - x_3 &= 4, \\
 x_1, x_2, x_3, x_4 &\geq 0.
 \end{aligned}$$

12.

$$\begin{aligned}
 f(x) &= 4x_1 + 3x_2 - x_3 - x_4 \rightarrow \text{extr}, \\
 x_1 + 2x_2 + x_3 &= 8, \\
 x_2 + 2x_3 + x_4 &= 6, \\
 x_1, x_2, x_3, x_4 &\geq 0.
 \end{aligned}$$

13.

$$\begin{aligned}
 f(x) &= x_1 - 2x_2 + 2x_3 - x_4 \rightarrow \text{extr}, \\
 x_1 + x_3 - 3x_4 &= 3, \\
 2x_1 + x_2 + x_4 &= 8, \\
 x_1, x_2, x_3, x_4 &\geq 0.
 \end{aligned}$$

14.

$$\begin{aligned}
 f(x) &= x_1 + 2x_2 - x_3 + 2x_4 \rightarrow \text{extr}, \\
 x_1 + 3x_3 + x_4 &= 10, \\
 x_1 + x_2 - 2x_3 &= 7, \\
 x_1, x_2, x_3, x_4 &\geq 0.
 \end{aligned}$$

15.

$$\begin{aligned}
 f(x) &= -3x_1 + 2x_2 \\
 -2x_1 + 3x_2 &\geq 6, \\
 x_1 + 4x_2 &\leq 16, \\
 x_1, x_2 &\geq 0.
 \end{aligned}$$

16.

$$\begin{aligned}
 f(x) &= -4x_1 \\
 4x_1 + 3x_2 &\geq 2 \\
 3x_1 + 2x_2 &\leq 12 \\
 x_1, x_2 &\geq 0.
 \end{aligned}$$

17.

$$\begin{aligned}
 f(x) &= -3x_2 \\
 4x_1 + 3x_2 &\geq 2, \\
 3x_1 + 2x_2 &\leq 12, \quad x_1, x_2 \geq 0.
 \end{aligned}$$