

Solving optimization problems

The objectives of the task: Strengthen the skills of the solution of linear programming problems.

Task Requirements: Solve linear programming problems.

Instructions for performing:

1. Create matrix of left side of inequalities **A**. - 0.4 points
2. Create matrix of free coefficients of inequalities **b**. - 0.4 points
3. Create matrix of the objective function **c**. - 0.4 points
4. Create matrix of boundary conditions **lb** and **ub**. - 0.4 points
5. Solve linear programming problem with help **karmarkar**. - 0.6 points
6. Output to the command window the result. - 0.4 points
7. Available Comments - 0.4 points.

Maximum evaluation are **3 points**

You need to create a script file with all matrices and solution, then obtain result in the command window. After that, then you need you should make a scan of the command window and send me the script file and the scan with result.

Criteria for evaluation: Available Comments, no mistakes.

Variants of tasks.

1. $W = 2x_1 - x_2 + x_4 \rightarrow \min$

$$\begin{cases} x_1 + x_2 + x_3 - x_4 \leq 1 \\ x_1 - x_2 + x_3 - x_4 \leq 0 \\ 2x_1 + x_2 + x_3 - x_4 \geq 3 \end{cases}$$
2. $W = x_1 + x_3 \rightarrow \max$

$$\begin{cases} 2x_1 - 7x_2 + 22x_3 \leq 22 \\ 2x_1 - x_2 + 6x_3 \leq 6 \\ 2x_1 - 5x_2 + 2x_3 \leq 2 \\ -4x_1 + x_2 + x_3 \leq 1 \end{cases}$$
3. $W = 3 + 2x_2 + x_3 \rightarrow \max$

$$\begin{cases} x_1 - x_2 + 2x_3 + x_4 \geq 1 \\ 2x_1 - x_2 + x_3 - x_4 \geq 1 \\ x_1 - 2x_2 + x_3 - x_4 \geq -1 \\ x_1 + x_2 + x_3 + 2x_4 \leq 5 \end{cases}$$
4. $W = x_3 + 3x_4 \rightarrow \min$

$$\begin{cases} x_1 + x_2 - x_3 - x_4 \leq 2 \\ x_1 - x_2 - x_3 + x_4 \geq 0 \\ -x_1 - x_2 + 2x_3 - x_4 \geq -3 \\ x_1 \geq 1 \end{cases}$$
5. $W = -x_1 + x_2 \rightarrow \max$

$$\begin{cases} x_1 - 2x_2 \geq 2 \\ 2x_1 - x_2 \geq 2 \\ x_1 + x_2 \geq 5 \end{cases}$$
6. $W = x_1 - x_2 - 2x_4 \rightarrow \max$

$$\begin{cases} 2x_1 - x_2 + 2x_3 - x_4 \leq 4 \\ x_1 - 2x_2 + x_3 - 2x_4 \geq 2 \\ x_1 - x_4 \geq 1 \\ x_2 + x_3 \leq 1 \end{cases}$$
7. $W = x_1 - x_2 + 3x_3 + x_4 \rightarrow \max$

$$\begin{cases} x_1 - x_2 + x_4 \leq 1 \\ x_2 - x_3 + x_4 \leq 1 \\ x_1 + x_3 + 2x_4 \leq 2 \\ -2x_2 + x_4 \leq 0 \end{cases}$$
8. $W = -x_2 - 2x_3 + x_4 \rightarrow \min$

$$\begin{cases} 3x_1 - x_2 \leq 2 \\ x_2 - 2x_3 \leq -1 \\ 4x_3 - x_4 \leq 3 \\ 5x_1 + x_4 \geq 6 \end{cases}$$
9. $W = x_1 + x_2 + 3x_3 - x_4 \rightarrow \max$

$$\begin{cases} x_1 - 5x_2 + 4x_3 \leq 5 \\ x_1 - 2x_2 - 3x_3 \leq 4 \\ x_1 + 6x_2 + 5x_3 \leq 4 \\ x_2 + x_3 \leq 1 \end{cases}$$
10. $W = -4 - 2x_1 - x_2 - x_3 \rightarrow \min$

$$\begin{cases} x_1 - 2x_2 + 3x_3 - 4x_4 \geq -10 \\ x_1 + x_2 - x_3 - x_4 \leq -4 \\ x_1 - x_2 + x_3 - x_4 \geq -6 \\ x_1 + x_2 + x_3 + x_4 \leq 10 \end{cases}$$
11. $W = x_1 + x_2 + x_3 + 1 \rightarrow \min$

$$\begin{cases} x_1 + x_2 \geq 0 \\ x_1 + x_3 \geq 1 \\ x_2 - x_3 \geq 1 \\ x_1 + 2x_2 + 3x_3 \geq 0 \end{cases}$$
12. $W = 2 + 2x_2 - x_3 + 3x_4 \rightarrow \max$

$$\begin{cases} -x_1 + x_2 - 2x_4 \geq -1 \\ x_1 + x_3 + x_4 \geq 1 \\ x_2 + x_3 - x_4 \geq 1 \\ x_3 \leq 4; \quad x_2 \leq 10 \end{cases}$$
13. $W = x_1 + x_2 + 3 \rightarrow \max$

$$\begin{cases} x_1 - x_2 \leq 1 \\ x_1 - 2x_2 \geq -2 \\ -x_1 + x_2 \geq -1 \\ 2x_1 + x_2 \geq -2 \end{cases}$$
14. $W = x_1 - 10x_2 + 100x_3 \rightarrow \max$

$$\begin{cases} x_1 + x_2 + x_3 \leq 1 \\ x_1 - x_2 - x_3 \leq 2 \\ -x_1 + 2x_3 \leq 0 \\ x_1 + 2x_3 \leq 5 \end{cases}$$
15. $W = -3 + x_1 + 3x_2 + 5x_3 \rightarrow \max$

$$\begin{cases} x_1 - x_2 + x_3 \leq 1 \\ 2x_1 + x_2 + x_3 \leq 1 \\ x_1 + 2x_2 + x_3 \leq 1 \\ x_1 + x_2 + 2x_3 \leq 1 \end{cases}$$