

Lettuce and tomatoes

Difficulty level: beginner

Keywords

- Production
- Linear Programming
- Graphical method
- Python+PuLP

Problem description

A farm must determine how many hectares of land they owe be dedicated to lettuce and tomato production. By cultivating one hectare of land, the company estimated that 20 quintals of lettuce and 30 quintals of tomatoes can be produced annually. To complete the crops, one laborer has to be assigned to each hectare planted with lettuce and two laborers have to be assigned to each hectare planted with tomatoes. In order to have enough manpower for other crops, the company does not want to use more than 100 workers. Also, the company sells every kilogram of lettuce and every kilogram of tomatoes for 1 euro and 1.5 euro, respectively. Moreover, it wants to ensure an annual profit of at least 50,000 euro from the sale of these two products.

Tasks

1. Identify the variables, the constraints, and the objective function of the problem.
2. How many hectares will the company have to dedicate to the cultivation of lettuce and how many to the cultivation of tomatoes, in order to minimize the total number of hectares cultivated?
3. Implement the mathematical model in Python and solve it by exploiting the PuLP library.