

General information and requirements for
Programming Task 2

Stages

The programming task consists of the following stages:

1. You are working in Team within you worked for programming Task 1.
2. Specify your linear program that can be solved by Interior-Point algorithm (not special case). You can use problems that you used in programming Task 1.
3. Perform the main task (write program using Interior-Point algorithm to solve LPP).
4. Test your code.
5. Report by Team leader.
6. Submit to Moodle. All members should submit in Moodle.

1. Team up

The same team as programming task 1. You can not work individually.

2. Search for tools/platform

Here, you need to select a programming language and search for platform. Platform should be free access.

3. Specify your linear program

You should find a linear program model to solve by Interior-Point algorithm (not special case). You can use problems that you used in programming Task 1. Compare your results obtained by Interior-Point algorithm with results obtained by programming Task 1 (Simplex method).

4. Perform the main task

Write a program that implements the Interior-Point algorithm. Pay attention that you are not allowed to use build in functions. You should write an algorithm that can solve LPP using Simplex method. You can find this algorithm in lecture slides or any book related to "Linear Programming".

5. Testing

Test your code on different functions and constraints (LPP).

6. Report by Team leader

Team leader should provide a short report about the contribution of team members. He/she should give grades to team members. Grade range is "0 to 5". "0" means no contribution and "5" means the highest contribution. For example, if all members were active, then the team leader should give "5" to all members.

7. Submit to Moodle.

Run your code, create a pdf from it and submit pdf and the link to the repository (for example Github) to Moodle for assessment before the deadline. All members should submit to Moodle before the deadline.

Notes:

- You can not solve programming tasks alone. You must be a member of a team.
- You cannot change your team during the whole course.
- Be sure that the link you provide works, otherwise your programming task will not be graded.

Instructions

1. Write a computer program in any programming language (e.g. Python, C++) to solve the defined system of linear programming with the use of iterative by Interior-Point algorithm.
2. Test on different functions and constraints.

Input format

The input contains:

- A vector of coefficients of objective function - C .
- A matrix of coefficients of constraint function - A .
- Set your initial starting point (manually, or generated by program).
- A vector of right-hand side numbers - b .
- The approximation accuracy ϵ .
- Set $\alpha = 0.5$.
- Compare you results with $\alpha = 0.9$.

Output format

The output contains:

- The string "The method is not applicable!"
or
- The string "The problem does not have solution!"
or
- A vector of decision variables - x^* by Interior-Point algorithm (when $\alpha = 0.5$ and $\alpha = 0.9$) and by Simplex method from programming Task 1.
- Maximum (minimum) value of the objective function when $\alpha = 0.5$ and $\alpha = 0.9$.

Report

Use the template provided for prog. task 1.