Technical University of Denmark

Constrained Optimization

Course 02612

Assignment 1

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Contents

1 Introduction

this is some report

2 Assignment

2.1 Problem 1 - Quadratic Optimization

blablablablbal

2.2 Problem 2 - Equality Constrained Quadratic Optimization

blablablablbal

2.3 Problem 3 - Inequality Constrained Quadratic Programming

From page 475 in Nocedal and Wright the following system is given.

$$
\begin{aligned}
\min_{x} q(x) = (x_1 - 1)^2 + (x_2 - 2.5)^2 \\
s.t. x_1 - 2x_2 + 2 >= 0, \\
-x_1 - 2x_2 + 6 >= 0, \\
-x_1 + 2x_2 + 2 >= 0, \\
x_1 >= 0, \\
x_2 >= 0.
\end{aligned} \tag{1}
$$

in MatLab a contour plot of this is made and seen in figure 1.

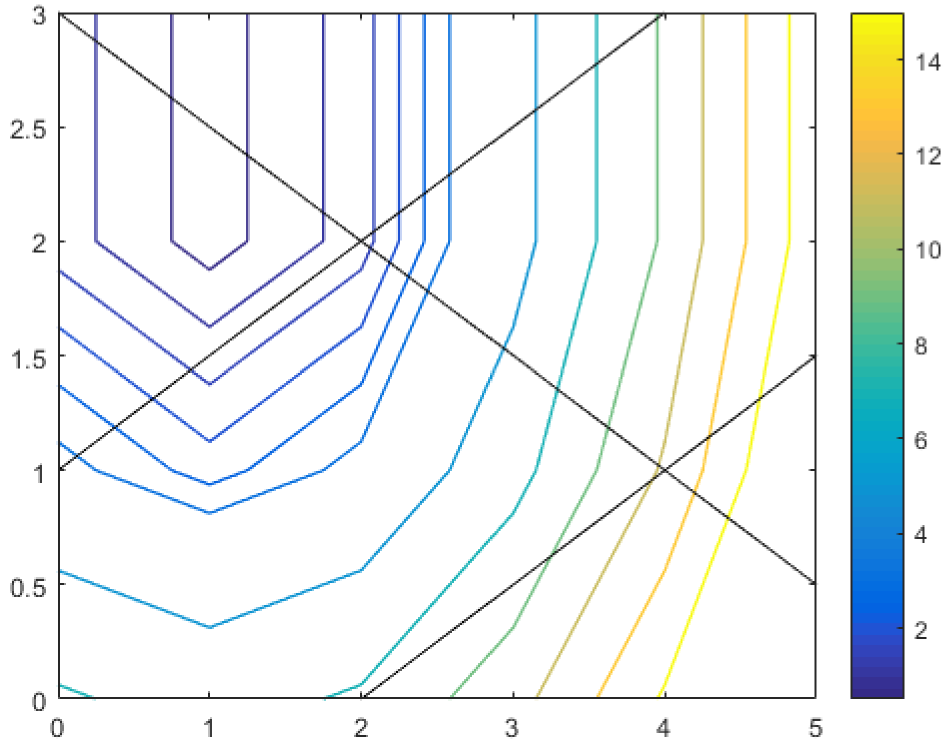

Figure 1: A contour plot of the problem.

From the line it is seen that the feasible region is a pentagon.
The problem can be written in the standart martix way as:

$$H = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$$

$$g = \begin{bmatrix} -2 \\ -5 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & -1 & -1 & 1 & 0 \\ -2 & -2 & 2 & 0 & 1 \end{bmatrix}$$

$$b = \begin{bmatrix} -2 \\ -6 \\ -2 \\ 0 \\ 0 \end{bmatrix}$$

Then the general KKT system can be written as:

$$\begin{bmatrix} H & -A \\ A^T & 0 \end{bmatrix}$$

*

$$\begin{bmatrix} x \\ \lambda \end{bmatrix}$$

=

$$\begin{bmatrix} -g \\ b \end{bmatrix}$$

2.4 Problem 4 - Markowitz Portfolio Optimization

blablablablbal

2.5 Problem 5 - Interior-Point Algorithm for Convex Quadratic Programming

blablablablbal

3 Conclusion

Some conclusions things