

Interior point methods — an introduction

David Pisinger

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Exercise 1

Solve the problem

$$\begin{array}{ll} \text{minimize} & -x_1 - 5x_2 \\ \text{subject to} & x_1 + x_2 + x_3 = 5 \\ & x_1 + 3x_2 + x_4 = 7 \\ & x_1, x_2, x_3, x_4 \geq 0 \end{array}$$

Use Matlab with the `pdip()` routine (by Michael C. Ferris) found at the home page. You need to use Matlab's sparse format. You can do this for the question given by defining

```
Aden = [1 1 1 0; 1 3 0 1];  
A = sparse(Aden);
```

Your answer should consists of:

- input for the algorithm
- output of the algorithm

Exercise 2

Describe as much of algorithm `pdip()` as possible. You may use the google search to find additional information about Cholesky factorization, Mehrotra's method etc.