Ma421 - Operations Research
IPSA Paris
2019 - 2020

Practical Work 1
Klee-Minty Complexity

1. Install **Anaconda** from the link : *https://www.anaconda.com/distribution/*

2. Read the documentation of **linprog(method='simplex')** from the link :
https://docs.scipy.org/doc/scipy/reference/optimize.linprog-simplex.html

3. With **linprog(method='simplex')**, solve all Linear Programming problems from the course and tutorials.

4. With **linprog(method='simplex')**, solve the Klee-Minty Linear Programming problems for $n = 2, \ldots, 5$ with the calculation time. *Do not use the change of variable from the tutorial 2.*

$$max \sum_{j=1}^{n} 10^{n-j} x_j$$

$$2\sum_{j=1}^{i-1}(10^{i-j}x_j) + x_i \leq 100^{i-1} \quad i = 1, 2, \ldots, n$$

$$x_j \geq 0 \quad j = 1, 2, \ldots, n$$

5. *Describe and implement a method to measure the complexity of solving the Klee-Minty problem.*

6. *Present the final results in two graphs with a relevant scale for each graph.*

7. *Compare your results with the scientific literature. Conclusion.*

8. *What happens when the change of variable from the tutorial 2 is used ?*

One report for a staff of two students but each student will send the report.
The report will be presented on ***one page recto-verso in two-column layout.***
You will only present the answers from question 5 to question 8.