

Simplex-udregner

Brugervejledning v1.3

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Versionshistorik

- 1.3 Engelsk sprogunderstøttelse tilføjet. Desuden har programmet fået en splash-screen.
- 1.2 Rettet: Forkert valg af pivotelement, når både **b**- og **c**-vektoren var negativ
- 1.1 Rettet: Forkert valg af pivotelement ved case 2 for minimeringsproblemet
- 1.0 Udgivelse af programmet.

1 Installation

Programmet skal ikke installeres – .jar-filen skal bare startes, hvilket på Windows-styresystemer normalt sker ved at dobbeltklikke, mens Linux-systemer ofte kræver manuel start med `java -jar` kommandoen. I begge tilfælde kræves, at en *Java Runtime Engine* (JRE) af version 7 eller højere er installeret på computeren.

2 Brug af programmet

2.1 Generelt

Simplex-udregner-programmet kan bruges til at løse lineære programmeringsproblemer ved hjælp af simplex-metoden. Efter indtastning af problemets objektfunktion og bibetingelser, omdannes problemet automatisk til standardformen

$$\begin{aligned} &\text{Maksimer} && c_1x_1 + c_2x_2 + \dots + c_nx_n \\ &\text{under bibetingelserne} \\ & && a_{11}x_1 + a_{12}x_2 + \dots + a_{1n}x_n \leq b_1 \\ & && \vdots \\ & && a_{m1}x_1 + a_{m2}x_2 + \dots + a_{mn}x_n \leq b_m \end{aligned}$$

eller

$$\begin{aligned} &\text{Minimer} && b_1y_1 + b_2y_2 + \dots + b_my_m \\ &\text{under bibetingelserne} \\ & && a_{11}y_1 + a_{21}y_2 + \dots + a_{m1}y_m \geq c_1 \\ & && \vdots \\ & && a_{1n}y_1 + a_{2n}y_2 + \dots + a_{mn}y_m \geq c_n \end{aligned}$$

Dette sker ved at gange ulighederne, der 'vender forkert' med -1 , og omdanne ligheder til to uligheder. Herefter opstilles problemet i en simplex-tabel.

Programmet accepterer både heltal, brøker på formen a/b , samt decimaltal med punktum som decimalseparator. Dog anbefales det, at bruge brøker frem for decimaltal, da den binære repræsentation af decimaltal kan være upræcis.

Der findes tre mulige output-indstillinger

- **Vis kun resultat:** Udregner simplex-tabellen automatisk, men viser kun resultatet.
- **Vis mellemregninger:** Udregner simplex-tabellen automatisk, og viser alle mellemregninger med henvisning til den case fra [Ferguson], der benyttes.
- **Vælg pivot manuelt:** Brugeren vælger selv, hvor programmet skal pivotere. Med denne indstilling tjekker programmet ikke, om det valgte element stemmer overens med pivotreglerne for simplex-metoden eller om problemet er løst/ikke har en løsning.

2.2 Begrænsning af trin

Som standard stopper programmet udregningen efter 1.000.000 trin. Ønsker man at slå dette fra, skal programmet køres fra en kommandolinje med argumentet `-noLimit`. Man kan dermed starte programmet uden trin-begrænsningen med

```
java -jar SimplexUdregner.jar -noLimit
```

såfremt man i kommandolinjen har navigeret sig frem til mappen hvori `SimplexUdregner.jar` er gemt.

2.3 Valg af sprog

Programmet starter som standard med dansk sprog, men engelsk kan vælges ved at bruge argumentet `-lang=english`, når programmet startes fra kommandolinjen.

3 Rapportering af fejl

Hvis du finder en fejl i programmet er du velkommen til at sende en kort beskrivelse af fejlen til bugs@rene-bc.dk, så det kan blive rettet i evt. kommende versioner.

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The inverse error function implementation in the Erf class is based on CUDA code developed by Mike Giles, Oxford-Man Institute of Quantitative Finance, and published in GPU Computing Gems, volume 2, 2010.

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The creation of the package "o.a.c.m.analysis.integration.gauss" was inspired by an original code donated by Sébastien Brisard.
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5 Referencer

[Ferguson] Thomas S. Ferguson. *Linear Programming: A Concise Introduction*. URL:
<http://www.math.ucla.edu/~tom/LP.pdf>.