Infinity numbers & Linsol

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Introduction

$$\infty$$

The project is separated in two parts:

- Infinity numbers
- Linsol (linear solver $\rightarrow$ simplex)

Infinity numbers

Defifition

Infinity number is a pair of real numbers. The one if for the real part and the other is for the infinity part.

$$(a; b) = a + b\infty, \textit{where } a \in \mathbb{R}, b \in \{-1, 0, 1\}$$

Infinity numbers

Comparison

- If the infinity part of the number is > 1 the number is $= \infty$
- If the infinity part of the number is > -1 the number is $= -\infty$
- $\infty = \infty$ and $-\infty = -\infty$
- If the infinity parts of the both numbers are $=0$ then we compare the real parts as normal $\mathbb{R}$

Note: If the *infinity part of the number* $\notin \{-1, 0, 1\}$ we get it to one of these values

Infinity numbers

Math operations

$$(a;b) \pm (c;d) = (a \pm b; c \pm d)$$

$$(a;b) \times (c;d) = (ab; ac + bc + bd)$$

$$\frac{(a;b)}{(c;d)} = \begin{cases} (\frac{b}{d};0) & d \neq 0 \\ (\frac{a}{c};\frac{b}{c}) & d = 0 \end{cases}$$

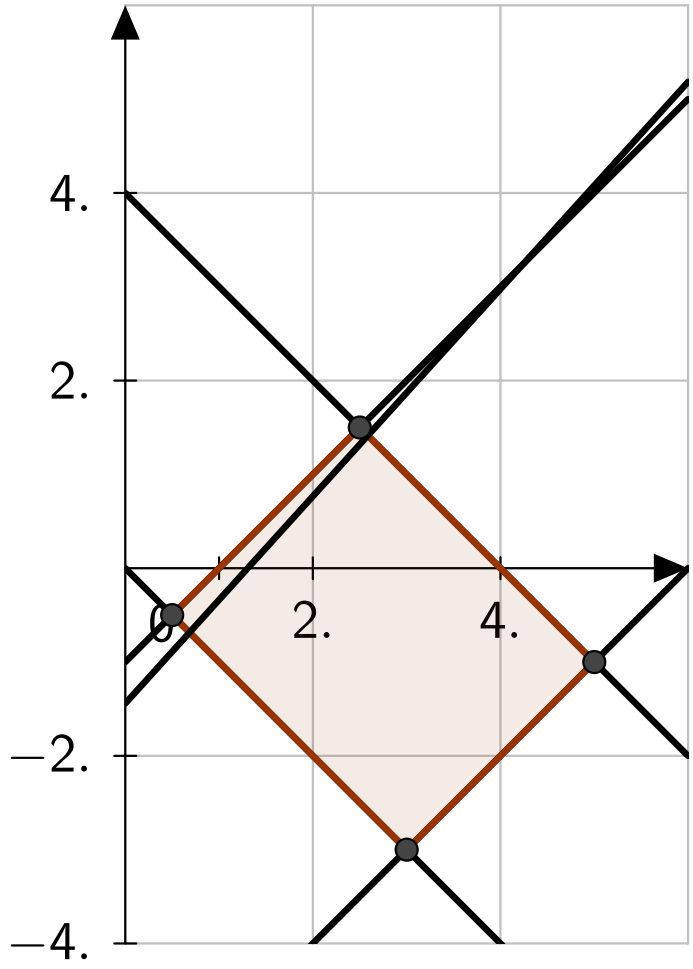
Note: If the *infinity part of the number* $\notin \{-1, 0, 1\}$ we get it to one of these values

Simplex

Definition

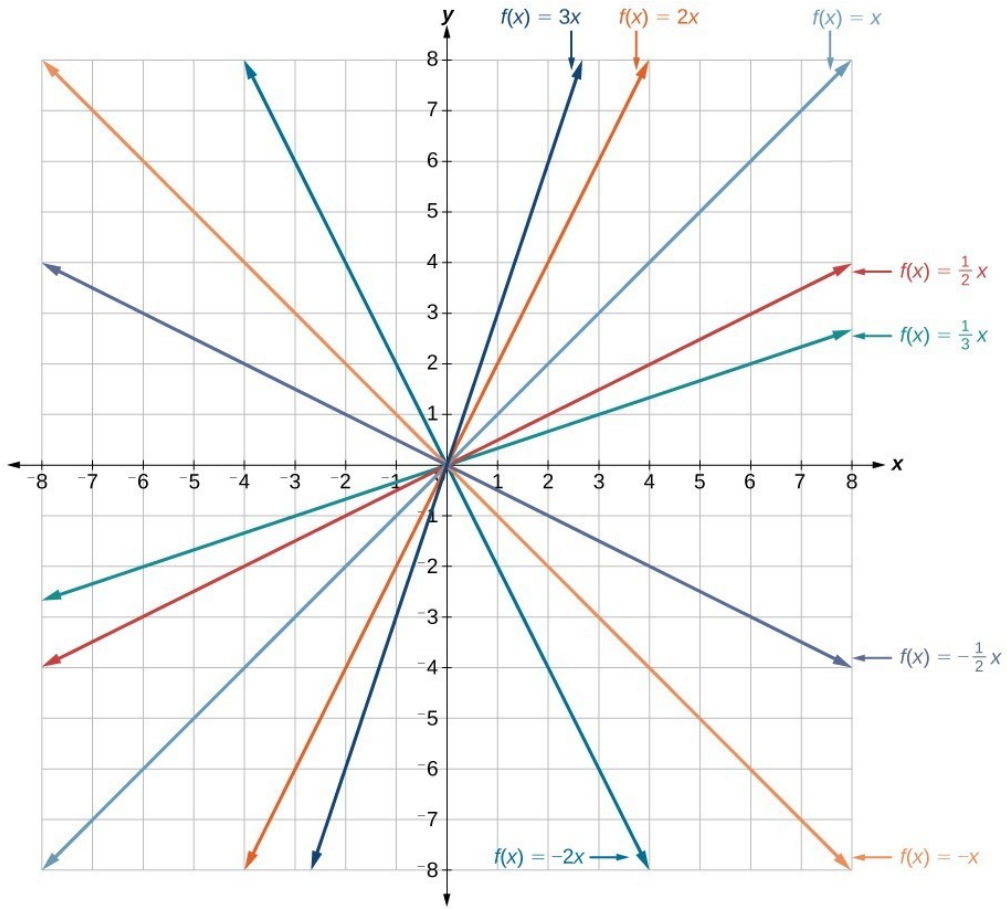
The simplex method is an algorithm for finding minimum/maximum value of a linear function with given linear constraints.

- Finds the figure of interection of the graphics of the constraints.
- Loop all of the vertices and find where the target function's value is optimal



Linsol

Linsol is a library written in Rust, which implements the simplex algorithm.



Live Demo

Code: https://github.com/Ro6afF/linsol

Future

- Clarify the conception of the infinity numbers
- Make the code working
- Improve the memory consumption
- Improve the speed
- Implement integer solving

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Resources

- *Rust compiler toolchain:* `https://www.rust-lang.org`. Copyright © 2015 The Rust Project Developers
- *LaTeX*. `https://www.latex-project.org/`.

Questions

THANK YOU
for your
ATTENTION!