

An overview of performance improvements of commonly used optimization algorithms

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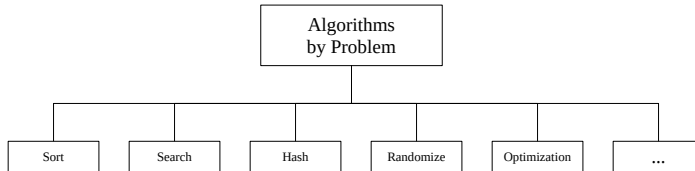
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Content

Motivation

Dunkelblau section

An ontology perspective of algorithms



On why optimization matter

Optimization plays an important role in machine learning, logitstics, tracking, portfolio management and more... [A Survey Of Optimization Techniques Being Used In The Field]

- Therefoer we want to do it as most as efficient as possible to exploit the best outcome...
- But how efficient or inefficient is optimization by its nature?

How in-efficient is optimization by its nature?

Consider we want to solve the Vehicle Routing Problem with time windows, suppose... [VEHICLE ROUTING PROBLEM WITH TIME WINDOWS]

- $N = 10,000$ in one day across metropolitan area
- $K = 200$ trucks
- The number of binary routing variables of the form is
$$N^2 * K = 10,000^2 * 200 = 2 \times 10^{10}$$

Just storing the full matrix for branch-and-bound can push you against memory limits.

How in-efficient is optimization by its nature?

To solve large problems, we need our algorithms be able to exploit hardware...

Performance tweaks of various optimization algorithms

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GPGPU exploitation for performance

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Multithreading for performance enhancement

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Experimental results

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Convulsion and Outlook

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Standard lists

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Formula example

Die Methode der *Fourier*-Transformation erlaubt eine Definition der MTF als Betrag der normierten Fouriertransformierten des Abbildes einer δ -Funktion

$$\text{MTF} = \left| \frac{\mathcal{F}\{s(x)\}}{\mathcal{F}\{s(x)\}|_{\omega_x=0}} \right| = \text{abs} \left(\frac{\int_{-\infty}^{\infty} s(x) e^{i\omega_x x} dx}{\int_{-\infty}^{\infty} s(x) dx} \right). \quad (1)$$

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This is beamer's
columns environment
in action.

See beamer's doc
for further
information.

“Tabulars” without and with layout

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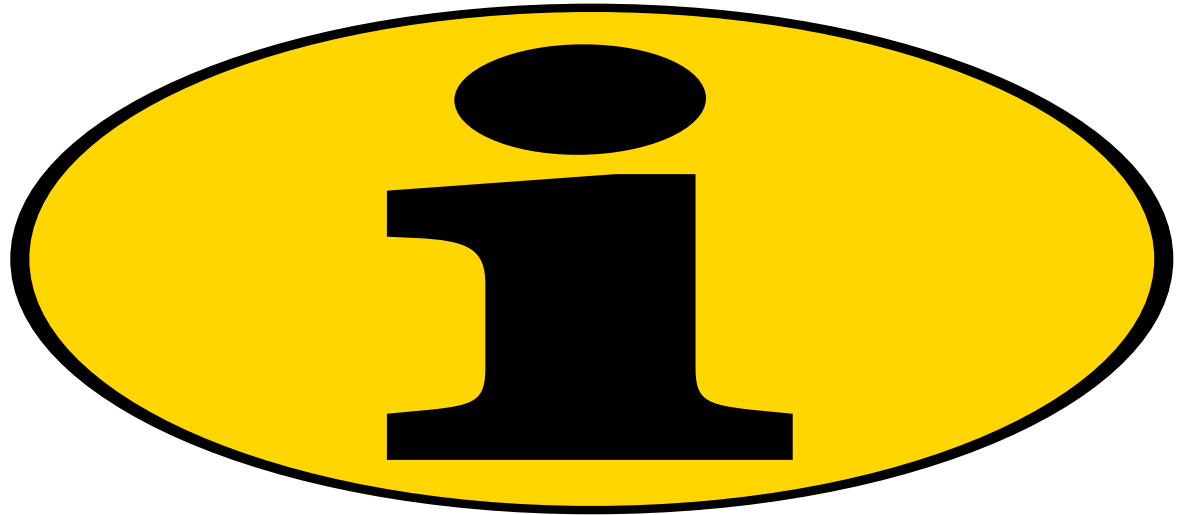
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Coloured slides

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Abschnitt 2

semi-dunkelblau section

beamer's standard blocks

Block

beamer's standard block with Uni-Göttingen colour.

Alert block

beamer's standard alert block with Uni-Göttingen colour.

Example block

beamer's standard example block with Uni-Göttingen colour.

More blocks in Uni-Göttingen colours

Uniblau block

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Dunkelblau block

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Grau90 block

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Schwarz block

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Mittelblau block

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Grau80 block

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Himmelblau block

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Grau60 block

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Chamois block

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Grau20 block

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beamer's theorem-like environments

Definition

beamer's definition environment with Uni-Göttingen colour.

Theorem

beamer's theorem environment with Uni-Göttingen colour.

Example (title add)

beamer's example environment with Uni-Göttingen colour.

Beweis.

beamer's proof environment with Uni-Göttingen colour.



Vielen Dank für Ihre Aufmerksamkeit

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