

Lab report:
The name of the course here
(template)

Part I: Local optimization algorithms, problem: QAP

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Thursday classes, 16:50.

I/we declare that this report and the accompanying source code has been prepared solely by the above author(s), and all contributions from other sources have been properly indicated and are cited in the bibliography.

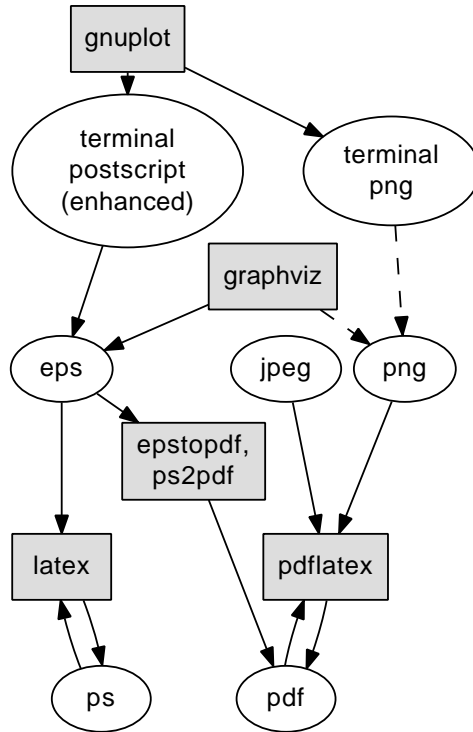


Figure 1: Example diagram from the *graphviz* program, which is a tool that automatically produces diagram layouts [1]. Remember that wherever possible, we use vector graphics – avoid embedding bitmaps in the document. In some cases, the use of bitmaps is justified (for quick on-screen previews or for extremely complex graphics containing, for example, hundreds of thousands of objects). The differences in raster and vector graphics are discussed (in Polish) in https://www.youtube.com/watch?v=_98SDNIpm24.

Authors’ contribution (if > 1 author)

- JK implemented..., performed an experiment..., described..., prepared...
- ES implemented..., performed an experiment..., described..., prepared...
- All authors have read and approved the complete, final report.

1 Introduction

This is a sample text in LaTeX. Read it carefully (the content, its source and the %comments) and use source `*.tex` source as a report template – this source shows how to

- insert a diagram created by graphviz (Fig. 1),
- insert a plot created by gnuplot (Fig. 2) and matplotlib (Fig. 3),
- cite bibliography formatted by bibtex [3, 2],
- refer to figures, references and parts of the report (for example, Sect. 2.1),
- as well as to equations: note, usually we do not write the word “equation”, we just write it like this:
In (1), a surprising property of some mathematical transformations is shown.

$$e^{i\pi} = -1 = \sqrt{-1}\sqrt{-1} = \sqrt{-1 \cdot -1} = \sqrt{1} = 1 \quad (1)$$

2 The characteristics of a good report

A good report

- allows the reader to independently reproduce the experiment (from data to results),
- contains no ambiguities,
- presents conclusions organized from general to specific,
- cites the literature in the text,
- does not include oversized listings,
- clearly presents the results – usually using plots,
- shows any numerical data with the correct number of significant figures,
- is concise and aesthetic.

An important rule of thumb when writing any report, thesis or paper is that the accompanying data, figures and plots should always have some sort of associated conclusions – to avoid overwhelming the reader with tables and graphs that they themselves must interpret, since they could not find the appropriate conclusions in the text. The evaluators of the reports evaluate the conclusions, not the fact that the computations were carried out and proved by the included results. In particular, including just the results and plots without explicitly written conclusions and interpretations is almost worthless from the evaluation point of view – because it says almost nothing about the author’s expertise and reasoning. If such a report, rich in results but deficient in conclusions, were by contrast read by an amateur who wanted to learn something new – they would hardly learn much. So there must be a balance in the report: the included results must have corresponding conclusions and must be commented on in some way, and the written conclusions must be explicitly supported by the included data (e.g., plots).

2.1 Typography

Remember about the difference between a hyphen¹ and a dash – as well as about citing any source material in the relevant places [4]. Cite a specific page, not the general address of the website. Write double quotation marks using “the method of two marks”. Accordingly, with single quotation marks we distinguish between ‘opening and closing’ ones.

For spell-checking the .tex file directly, there is, among others, the *aspell* program. It understands various text encodings and has built-in filters for html and other popular formats. With these filters, it omits keywords specific to a given file format, and only analyzes the actual text.

3 Plots

For processing text result files and drawing plots, Python accompanied by the matplotlib library is excellent. They are definitely worth learning! Before you prepare a plot, you can watch tips (in Polish) on creating plots and follow them – how to make a legible and professional plot: <https://www.youtube.com/watch?v=pfSgcsQ2Mtk>.

¹Read Wikipedia’s description of the entry “Hyphen”.

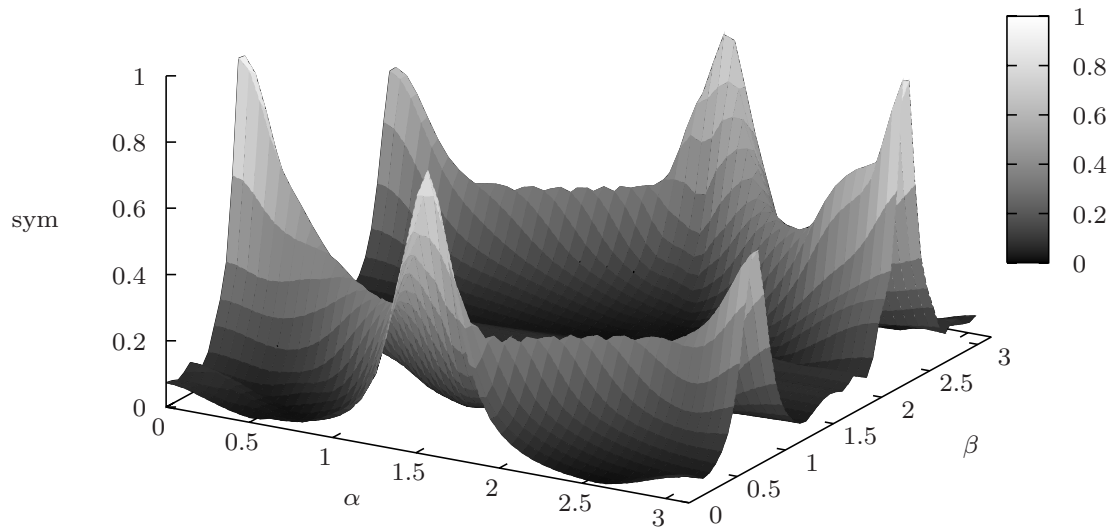


Figure 2: A sample plot, this one produced by the `gnuplot` program.

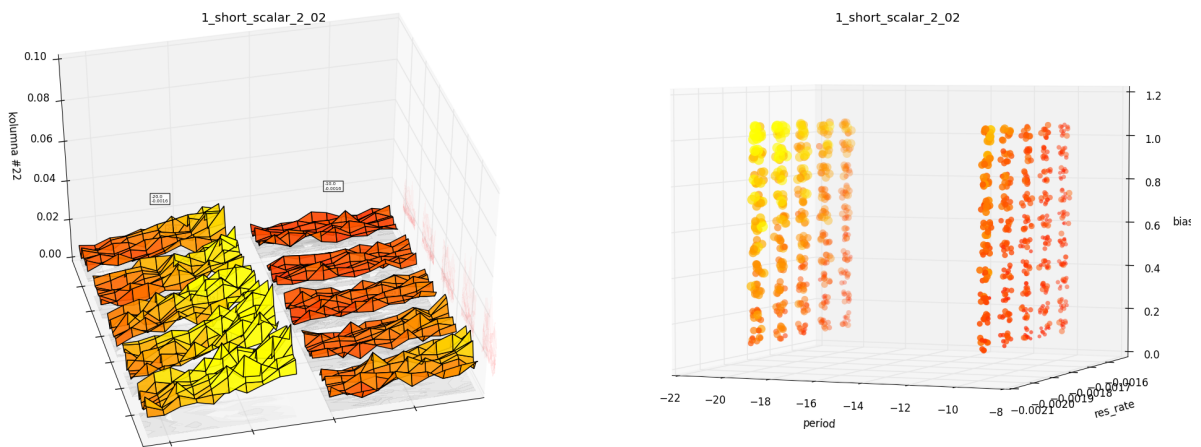


Figure 3: A sample visualization in `Python+matplotlib`; here, 5D data shown in two ways in 3D. What is wrong with this figure? Bitmaps are used (incorrectly – should be vector graphics), and the plots here are too small (illegible).

4 In closing

And now something extra. As you have read this entire text source, handle one inconspicuous sentence:
<http://www.mooncoder.com/latex-challenge.html>

References

- [1] Emden R. Gansner and Stephen C. North. An open graph visualization system and its applications to software engineering. *Software – practice and experience*, 30(11):1203–1233, 2000. URL: <https://www.graphviz.org/>.
- [2] D. E. Goldberg. *The Design of Innovation: Lessons from and for Competent Genetic Algorithms*. Kluwer Academic Publishers, 2002.
- [3] Maciej Komosiński and Maciej Hapke. Optimization – local search, 2023. Lecture notes. URL: <https://www.cs.put.poznan.pl/mkomosinski/lectures/optimization/LS-en.pdf>.
- [4] Wikipedia. Dash – wikipedia, the free encyclopedia, 2014. URL: <http://en.wikipedia.org/wiki/Dash>.