

Project 3

For the course FYS3150

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October 14, 2019
Week 40 - ??

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Kommentarer fra project 1 på devilry:

- Abstract: short motivation and presentation of the results and the findings
- Introduction: you want to motive the reader about the problem and why you want solve it
- Theory: explaining the theory behind the solution method and the problem
- Method/implementation: how you implement the solution in order to fix/solve the problem
- Results/graphs/tables: presenting the results
- Discussion: Discussing the result from previous section
- Conclusion: concluding the findings, your neutral opinion, etc... and future work
- Appendix: How you derived your method, theory, etc... , altså utledning av ting i teori som ikke spesifikt er et bevis

Ting å gjøre for de ulike oppgavene:

- 3a: beregne integralet, how many mesh points, lage et plott for å sjekke om grensene er passende å bruke
- 3b: finne grensene, erstatte Gauss-Legendre metoden med Laguerre polynomer, sammenligne med resultater fra a
- 3c: nå bruke brute force Monte Carlo, sammenligne resultatene med tidligere
- 3d: forbedre Monte Carlo med bruk av importance sampling, kommentere resultatene, lage en liste over tidene, sammenligne resultatene
- 3e: parallellisere koden fra 3d med openMPI eller MPI, kommenter resultatene (hovedsakelig i tiden brukt)

1 Abstract

hensikt: tilnærme løsningen til integralet så best som mulig $5 \pi^{**2} / 16^{**2}$.

2 Introduction

All programs are found at our [GitHub-repository](#).

3 Theory

$$\begin{bmatrix} d & a & 0 & \dots & 0 & 0 \\ a & d & a & \dots & 0 & 0 \\ 0 & a & d & \dots & 0 & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots & \vdots \\ 0 & 0 & 0 & a & d & a \\ 0 & 0 & 0 & 0 & a & d \end{bmatrix} \begin{bmatrix} u_1 \\ u_2 \\ u_3 \\ \vdots \\ u_{N-2} \\ u_{N-1} \end{bmatrix} = \lambda \begin{bmatrix} u_1 \\ u_2 \\ u_3 \\ \vdots \\ u_{N-2} \\ u_{N-1} \end{bmatrix}$$

4 Method

5 Results

Our results are as shown in the [Appendix](#). We also have `.txt`-files for all the raw data generated by the projects up on [GitHub](#).

- How many mesh points do you need before the results converges at the level of the third leading digit?

6 Discussion

7 Conclusion and perspective

8 Appendix

9 References

[Link to the PDF for Project 2.](#)

[Our GitHub-repository.](#)

[Link to lecture slides in FYS3150 - Computational Physics.](#)

[Offical Armadillo website for documentation of all contents in the library.](#)

[Analytical results for specific oscillator frequencies.](#)