

Lab 2: Laplace and Inverse Laplace Transforms

Preamble

Associated Class Notes

This lab supports the materials covered in [Chapter 3 Laplace Transforms](https://cpjobling.github.io/eg-247-textbook/laplace_transform/index) (https://cpjobling.github.io/eg-247-textbook/laplace_transform/index) of the course notes. You may wish to refer to the Worksheets [worksheet 4](https://cpjobling.github.io/eg-247-textbook/laplace_transform/1/worksheet4) (https://cpjobling.github.io/eg-247-textbook/laplace_transform/1/worksheet4) and [worksheet 5](https://cpjobling.github.io/eg-247-textbook/laplace_transform/1/worksheet5) (https://cpjobling.github.io/eg-247-textbook/laplace_transform/1/worksheet5) for additional examples to try.

Other formats

This document is available in [HTML](https://cpjobling.github.io/eg-247-textbook/labs/lab02/index) (<https://cpjobling.github.io/eg-247-textbook/labs/lab02/index>) format for online viewing and [PDF](https://cpjobling.github.io/eg-247-textbook/labs/lab02/lab02.pdf) (<https://cpjobling.github.io/eg-247-textbook/labs/lab02/lab02.pdf>) for printing.

Acknowledgements

These examples have been adapted from [Chapters 1](https://ebookcentral.proquest.com/lib/swansea-ebooks/reader.action?docID=3384197#ppg=17) (<https://ebookcentral.proquest.com/lib/swansea-ebooks/reader.action?docID=3384197#ppg=17>), [2](https://ebookcentral.proquest.com/lib/swansea-ebooks/reader.action?docID=3384197#ppg=43) (<https://ebookcentral.proquest.com/lib/swansea-ebooks/reader.action?docID=3384197#ppg=43>) and [3](https://ebookcentral.proquest.com/lib/swansea-ebooks/reader.action?docID=3384197#ppg=79) (<https://ebookcentral.proquest.com/lib/swansea-ebooks/reader.action?docID=3384197#ppg=79>) of {% cite karris %}.

Aims

The purpose of this laboratory is to explore more of the features of the MATLAB *Symbolic Math Toolbox*, in particular the `laplace` and `ilaplace` functions. These will be used to verify some of the properties of the Laplace transform typically published in textbooks and in tables of properties and transforms and to solve some inverse transform problems.

Assessment criteria

Marks will be awarded according to how many of the parts of Lab Exercise 2 and 3 have been completed.

Detailed marking criteria for this and the other labs and the project are given in the linked [Assessment Criteria](#)

(<https://docs.google.com/spreadsheets/d/1EQzwSfGMdw8oiQds4bUR8sZTCgb2IMv8hW4/edit?usp=sharing>) [Google sheet]

Setup

Before you start

If you haven't already, create a suitable folder structure on your file-store for your labs.

I suggest

```
P:\workspace
  signals-and-systems-lab
    lab01
    lab02
    :
```

Use folder `p:\workspace\signals-and-systems-lab\lab02` for this lab.

Lab Exercises

Lab Exercise 2: Laplace Transforms

Use file save as to download the script [laplace_lab.m \(laplace_lab.m\)](#). Open the script as a Live Script and use the Matlab `laplace` and `ezplot` functions as appropriate to complete the examples given in the comments in the script.

Save and upload the resulting modified script as a Live Script file

`laplace_lab.mlx` to the **Lab 2: Laplace and inverse Laplace transforms** assignment in Canvas.

3 Marks

Lab Exercise 3: Inverse Laplace Transforms

Use file save as to download the script [ilaplace_lab.m \(ilaplace_lab.m\)](#). Open the script as a Live Script and use the Matlab `laplace`, `ilaplace` and `ezplot` functions as appropriate to complete the examples given in the comments in the script.

Save and attach the resulting modified script as a Live Script file

`ilaplace_lab.mlx` to the **Lab 2: Laplace and inverse Laplace transforms** assignment in Canvas.

2 marks

What to Hand In

Claim

Up to three marks can be claimed according to how much of Exercise 2 you have completed and Exercise 3 is worth an additional 2 marks.

Make your claim by downloading and editing the labwork claim form and declaration: [lab02-claim.docx](#) ([lab02-claim.docx](#)) [Word].

Submission

You should submit the following to the **Lab 02: Laplace and inverse Laplace transforms** Assignment on Canvas.

1. The completed labwork claim form and declaration.
2. As evidence for completion of the lab exercises, you should submit your completed versions of the Live Script files `laplace_lab.mlx` and `ilaplace_lab.mlx`.

Deadline

The Deadline for claims and submission is:

4:00pm, 28th February 2020.

Peer assessment procedure for this lab

On Monday 2nd March, you should receive notification that the submissions of two of your colleagues are available for peer assessment. This notification will arrive by email (if you have your Canvas notifications turned on) or via the inbox on Canvas or the Canvas Student App.

This is the procedure you should follow:

1. Read again the document on [Peer Assessment \(../peer-assessment\)](#) ([PDF \(../peer-assessment.pdf\)](#)) before starting your assessment.
2. Check that the files are downloaded and named correctly as per the note on [Filenaming Conventions \(../peer-assessment#Important-note-about-file-names\)](#) in the peer-assessment document.
3. Open the Live Script file `laplace_lab.mlx` and execute **run all**. Check that the results are all present and that there are no errors. Review the formatting of the file and think about how readable and understandable the script is as a record of the experiment.
4. Repeat for `ilaplace_lab.mlx`.

Doing More

If you have time remaining, you may wish to work through [Appendix B of the textbook \(http://site.ebrary.com/lib/swansea/reader.action?docID=10547416&ppg=17\)](#). This chapter introduces Simulink in a way that matches the presentation in the rest of the book.

Reference

{% bibliography --cited %}