

CMEE Masters: Long-Practical Assessment

Assignment Objectives: To work on a computational model-fitting problem and produce a written report, all in a coherent, reproducible, modular workflow under version control.

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Note: I am playing the role of somebody trying to understand and use your project organization and workflow from scratch. So it will seem like I am being particularly pedantic in places — please take it in the right spirit!

Overall Project Organization

All the directories were in place, but there was an extra Code directory!

You had no `readme` file. The Readme is important. It should include a sentence or so for each of the files in the Code directory and instructions for how to run the project. You should also list packages needed / dependencies (could have mentioned what these packages are for) in the readme.

Ideally you should have put the writeup \LaTeX source files and pdf in a separate directory. This is what you should aim to do for your final dissertation.

Overall your organization was good, but some scope for improvement.

The Code

The code was well-compartmentalized into separate scripts. Each script was reasonably neat and well commented. There were quite a few comments, more for yourself than for the general user. OK for now, but you don't want to get into the habit of doing that too much — delete unnecessary comments for the final submission of a software product.

Your solution for getting NLLS fitting to work on as many curves as possible was OK. If you are interested in seeing a more optimized solution for the fitting, I have uploaded a some Python code to the CMEE Master repo `Solutions` directory.

The use of Python was “forced” in that it was only used to patch together the workflow, and not for any of the other steps, but that's OK to an extent given the difficulty level of the fitting code development.

Running the project script gave no errors.

The \LaTeX report was fine and it compiled. But a key problem with your workflow is that the pdf would be generated even if the input files to the \LaTeX code fail to be updated. So even if certain steps in the workflow give errors, the report will still be generated! In general, you should write into your workflow commands that will delete all existing output files every time the workflow is run (they should be re-generated afresh), and also put in checks so that the computational workflow aborts if any step in the analysis gives an error.

The script did run reasonably fast. But it always helps to think about speed bottlenecks — you should do so in you main project.

There were almost no messages displayed on the terminal about the progress of the analysis/workflow — there is scope for improvement here. It is a good idea to display messages to update the user on what was going on at a finer level. And ideally, those messages should be clearly delineated, with newline characters with some special characters such as asterisks.

Overall, well done!

The Report

Your report shows a very good understanding of the problem. You addressed the main questions asked and the methodology was appropriate and explained step by step with sufficient clarity for the work to be replicated (especially given your re-useable software, of course!). In the methods you say you use R, but if you have also used Python, you should mention it.

The report is quite well structured, with a heading for each section. However, the last subsection in Methods was blank. Also, there are some parts that could be moved to other sections for clarity. For example, you explain the parameters of the Sharpe-Schoolfield model in the Introduction, but do not show the equation until the methods section.

The presentation is good, but the affiliation should be formatted in article format.

The quality of the figures and tables is good, but some improvements could be made. For example you could have split your figures into traits and habitats, rather than all together. Also, sometimes you use italics in the caption and sometimes not. In Figs 4 and 5, it is not clear if the two lines after the caption correspond to the figure or not.

The use of references and bibtex was good overall, but sometimes references were not compiled or were missing, such as in line 187.

Regarding data preparation: you should have removed negative and 0 values within each ID and not across all traits. And why subtract -285 from 6, as you mention in the text. Also, why do you only require 2 unique temperatures but 5 trait values? You need at least 5 different temperatures as well.

About your results: the values of E that you get are too low, and the reason can't be units. Related to this lines 194-198 in the discussion are not consistent. Finally, it seems impossible that 100% of your SE for $T_p k$ are less than 1 — you need to check that.

Apart from these issues, your report shows very good effort overall. You give good insights and propose possible explanations for the results obtained, discussing the pros and cons of the three models (good !) and resolving the question of which of them best fits thermal responses.

Well done!

Overall Assessment

50/50 Computing/Report weightage for the marks here.

Marks for the project and computational workflow: 68

Marks for the Report: 67

Overall Marks:

The coursework marking criteria (included in this feedback) were used for both the computing and report.

Note that your final dissertation project marks are going to be based pretty much exclusively on the written report and viva (not code)! Expect your final dissertation report to be marked more stringently, using the dissertation marking criteria (also included in this report). Ultimately, keep in mind that this mini-project was to a degree a pedantic exercise in reproducible workflow development — you may need to trade-off some computational elegance (but hopefully not reproducibility!) such as having everything run with one `run_project` command for a really good written report. The main thing to keep in mind is one or both of your markers will likely not be particularly quantitative, so you will need keep the explanations simple (but not patronizingly so!).

Well done overall, and good luck with you main project!

Signed: Samraat Pawar

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MARKING CRITERIA for EXAMS and ESSAYS and COURSEWORK

The following criteria are the basis on which the Department assesses both exam answers and coursework.

Literal Grade	Criteria (Problem type answers are marked on a semi-absolute scale)
A*	Exceptional Answer is an exceptionally well presented exposition of the subject, showing: (i) command of the relevant concepts and facts, (ii) a high critical or analytical ability**, (iii) originality, and (iv) evidence of substantial outside reading (where applicable). Numeric marks available 100, 95, 90, 85.
A	Excellent Answer is a very well presented exposition of the subject, showing many of the above features, but falling short in one or two of them. Numeric marks available 80, 76, 72.
B	Very Good to Good Answer (i) shows a clear grasp of the relevant concepts and facts, (ii) gives an accurate account of the relevant taught material (<i>as exemplified in the model answer</i>), and (iii) shows evidence of some outside reading or of critical or analytical ability**. Numeric marks available 68, 65, 62.
C	Adequate Answer: (i) shows a grasp of the basic concepts and facts, (ii) gives a mainly accurate account of at least half of the relevant taught material (<i>as exemplified in the model answer</i>), and (iii) does not go beyond that, or goes beyond that but is marred by significant errors. Numeric marks available 58, 55, 52.
F	Unsatisfactory Answer: 1.shows only a weak grasp of the basic concepts and facts, and is marred by major errors or brevity; numeric marks available 48, 45, 42; 2.shows a confused understanding of the question; is too inaccurate, too irrelevant, or too brief to indicate more than a vague understanding of the question; 35, 30, 25; 3.includes at most one to four sentences or facts that are correct and relevant to the question; numeric marks available 20, 15, 10, 5; 4.contains nothing correct that is relevant to the question; numeric mark 0.

** *Analytical* = assessing a hypothesis or statement by breaking it down into its elements and examining their inter-relationships and contribution to the whole; cf. *Critical* = judging a hypothesis or conclusion by examining the validity of the evidence adduced for it.

**MSc & MRes PROJECT ASSESSMENT – THESIS (OR MID-PROJECT REPORT)
MARKING CRITERIA**

Literal Grade	% Grade	Criteria (Please give leeway if it is a mid-project report)
A*	100 95 90 85	Exceptional. Work is of a publishable standard**. It is an exceptionally well presented exposition of the project, showing: (i) command of the relevant concepts and facts, (ii) a high level of analysis, (iii) originality in thought and experimental or modelling design, and (iv) mastery of the relevant literature.
A	80 76 72	Excellent. Thesis is written to a publishable standard** with minor revision. It is a very well presented exposition of the project, showing most of the above features, but falling short in one of them.
B	68 65 62	Very Good to Good. Thesis contains potentially publishable material**, but needs revision of the text and further research. It is otherwise a well presented exposition of the project, showing: (i) a clear grasp of the relevant concepts and facts, (ii) appropriate, though not highly sophisticated analysis, and (iii) a sound knowledge of the relevant literature.
C	58 55 52	Adequate. Thesis is not written to a publishable standard and requires major revision and substantially more research. It is an adequately presented exposition of the project, showing: (i) a grasp of the basic concepts and facts, (ii) an adequate use of statistics in its analyses, and (iii) sufficient knowledge of the relevant literature to set its results in a scientific context.
D	48 45 42	Unsatisfactory. Thesis is an incomplete presentation of the project and is marred by major errors or gaps, missing analysis, lack of references, misconceptions, excessive brevity, etc, at most showing a weak grasp of the basic concepts and facts.
	35 30 25	Thesis as above, but presentation extremely poor and overall impression indicates a very weak grasp of the basic concepts and facts.
	20 15 10	Thesis as above, and in addition no real attempt to analyse data or present results in a scientific manner.
	5	Thesis as above but incomplete and lacking understanding in all areas.
	0	Thesis not produced.

** This publishability implies that the data or theory is *per se* worth publishing.