EE/RPPF

For use from May/November 2018

International Baccalaureate®
Baccalauréat International
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Candidate personal code:

Extended essay - Reflections on planning and progress form

Candidate: *This form is to be completed by the candidate during the course and completion of their EE. This document records reflections on your planning and progress, and the nature of your discussions with your supervisor. You must undertake three formal reflection sessions with your supervisor: The first formal reflection session should focus on your initial ideas and how you plan to undertake your research; the interim reflection session is once a significant amount of your research has been completed, and the final session will be in the form of a viva voce once you have completed and handed in your EE. This document acts as a record in supporting the authenticity of your work. The three reflections combined must amount to no more than 500 words.*

The completion of this form is a mandatory requirement of the EE. It must be submitted together with the completed EE for assessment under Criterion E. As per the 'Protocols for completing and submitting the Reflections on planning and progress form' section of the EE guide, a mark of 0 will be awarded by the examiner for criterion E if the RPPF is blank or the comments are written in a language other than that of the accompanying essay.

Supervisor: *You must have three reflection sessions with each candidate, one early on in the process, an interim meeting and then the final viva voce. Other check-in sessions are permitted but do not need to be recorded on this sheet. After each reflection session candidates must record their reflections and as the supervisor you must indicate the month that the reflection session took place, the candidate's year of DP study at that time and initial this form.*

First reflection session

Candidate comments:

As a physics enthusiast, I originally sought to complete my extended essay in physics relating to the RLC circuit. With difficulties in sourcing lab equipment, I decided to move to mathematics, still focusing on RLC circuits. I plan to investigate different methods of solving the RLC differential equation (DE) and find the most computationally efficient method. My initial research led me to two distinct methods: undetermined coefficients and the Laplace transform. I plan to implement these methods in Python to determine the time it takes, as a measure of efficiency, to solve the DE. My main aim is to develop the intuition behind the steps involved in each method and present a holistic understanding and comparison. Being new to LaTeX, I must learn to use it effectively

Month: September DP year (1 or 2): 2 Supervisor initials:

Interim reflection

Candidate comments:

My research focus has shifted significantly. Initially, I intended to explore various methods of solving the RLC DE, but I found the solution widely available in electrical engineering textbooks, offering limited opportunity for personal insight. I redirected towards a numerical methods EE where I focused on the RL circuit instead as it is modelled by a more accessible first-order DE. I originally planned to analyse Euler's, Heun's, and Runge-Kutta 4 by comparing their local and global truncation error (GTE) and convergence rates. However, I have decided to only focus on Euler's as deriving each method, their respective error bounds, and analysing them, would be impossible within the 4000-word limit. Concentrating on Euler's would allow me to delve deeper into a concept that is only introduced at a surface level in the IB syllabus and develop the insight behind the iterative process of a numerical methodsomething lost with higher-order methods. The main challenge thus far has been communicating the mathematics I use effectivelyit should be clear to the reader why certain theorems and lemmas are introduced.

Month: December DP year (1 or 2): 2 Supervisor initials:

Final reflection - Viva voce

Candidate comments:

I believe that I have answered my RQ successfully, showing that Euler's method is accurate when the GTE can be computed. At the end of the EE, I was able to uncover the relationship between the Taylor series and Euler's method surprisingly as these two concepts seem distinct at face value. I was pleased to keep the Laplace transform; although the DE can be solved via integrating factors, I felt that adding the transform would show how a more sophisticated framework, can simplify the process of solving a DE. I am pleased to integrate technology through my EE, using Python to implement Euler's method and plot the output. The main skill I learned from the entire process was to read proofs and communicate mathematics effectively. By learning conventions used in mathematics journals and rearranging the order in which I introduce my theorems, I feel my mathematics is now more articulate and has a "narrative" woven through. As I plan on pursuing a STEM degree, mathematics will be integral to my degree and I am fortunate to foster this skill with my EE. With a larger word count, I would have compared different numerical methods as originally planned.

Month: February DP year (1 or 2): 2 Supervisor initials:

Supervisor comments:

***Supervisor**: By submitting this candidate work for assessment, you are taking responsibility for its authenticity. No piece of candidate work should be uploaded/submitted to the e-Coursework system if its authenticity is in doubt or if contradictory comments are added to this form. If your text in the box below raises any doubt on the authenticity of the work, this component will not be assessed.*