Modeling Recovery after Circadian Rhythm Disruption

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1 Abstract

A brief summary of the objectives, methods, and key findings

2 Introduction

Modelling human circadian rhythm is a topic of great interest in biology as it is the biological mechanism that governs the periodical processes of the body, such as sleep-wake cycles. Circadian rhythm is almost exclusively modelled by ODEs, making this topic highly suitable for this course. The topic of circadian rhythms is of personal relevance to the authors as we all share the universal university experience of sleep loss before a midterm, which leads us to wonder if we can mathmatecally model what happens to our circadian rhythm after we pull an all-nighter. This leads to the research question: how long it takes for the circadian rhythm to recover after being disrupted by an all nighter? Due to the existance of multiple established models of circadian rhythm we will be comparing the models in the papers of Forger, Jewett, and Hannay and evaluating their accurcies using the Recovery Ratio.

3 Mathmatical Model and Theoretical Background

Present core equations, derivations, or theoretical tools.

4 Methodology

Detail any computational/numerical methods or experimental setup.

5 Results

Present and interpret key results using figures, graphs, or tables.

6 Discussion

Interpret your findings, identify limitations, and suggest further work.

7 Conclusion

Summarize your contribution.

8 References

Include a properly formatted bibliography.

9 Appendix

For appendix, include rough code that did not make it into the report