

# Peer Review on the Intermediary report Project

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## 1 Introduction

The goal of this review is to analyse the intermediary report done by the group C, and to give them constructive feedback in order to improve their future analysis.

## 2 Quick resume

This report present the preliminary analysis of an non homogenous cylinder travel time on an inclined rail. The authors mainly present the parametrisation used to reduce this non-homogenous problem from five dimension to three parameters physical motivated (Inertia, center of mass and the angle at initial position). The group shares an appropriate polynomial model (linear, interaction, quadratic) and state clearly their next steps.

## 3 Constructive Feedback

### Strength

The organisation of the rapport is logical and well structured : clear introduction of the problem, the objectives are set without ambiguity (minimizing travel time of the cylinder), identification of the controllable factors and a progressive presentation of the parametrisation. The technical terminology is appropriate and fits well a DOE project.

### 3.1 Introduction and Objective

The introduction and objective are precise in their explanations. However, to further improve a future report stating with more details the initial settings of the experiment could be interesting. Explaining of the experiment will be conducted (i.e. a step by step guide of the experimental process), the different possibilities of the position of the weights and in general more information of the material used is important to include in a report for scientific reproducibility.

### 3.2 Factors and parametrization

The authors mentioned the normalized values can be from 0 to 1 or -1 to 1 but don't explain why that is the case, which one they are going to use and why. Additionally they simply mention that one can go from an experimental space with five factors to three because of the laws of physics. A more in depth explanation would be appreciated, for example how you arrived to that conclusion, what was the thought process, etc... However, they do state clearly the equation to change from one parametrization to the other.

### **3.3 Domain**

The figures included of the domain of experiment are interesting to have in the report, however a more detailed explanation of those figures would enhance the quality of the report. Assuming that the reader does not know what they are looking at/ reading about is always a good rule of thumb to follow when writing a report of this sort.

### **3.4 Model**

The authors successfully identified three models that could model the response appropriately of this experiment, but omit to say how they chose those. Adding what physical response of the experiment made them think that one could work better than the other, as well as, adding the consequence of choosing one compared to the other would also be interesting.

We recommend that the methods section include the full Experimental Design Matrix used in the study. Furthermore, reporting the Variance Inflation Factor (VIF) for this design would significantly strengthen the justification of the experimental plan and confirm the absence of problematic multicollinearity prior to data collection.

## **4 Conclusion**

This is a clear and well organize report. They state clearly the goal of this experiment. They explain their method of dimension reduction of the experimental space clearly, but more details would be appreciated to fully understand their reasoning. They mentioned the models that could be used to represent this experiment but give no physical intuition to why we should be using those models.