



光華劍橋
Guanghua Cambridge School

The Effects on the Period of Compound Pendulum due to Liquid Damping

Jintian Wang

上海光華學院劍橋國際中心
Guanghua Cambridge International School



光華劍橋
Guanghua Cambridge School

CONTENTS

- **Background**
- **Objectives**
- **Research Process**
- **Timeline**



BACKGROUND

- **Pendulum is important**
- **Simple pendulum?**
- **Compound pendulum?**
- **With damping**

Not major

Ideal model

Liquid



OBJECTIVES

Compound pendulum + Liquid damping

Calculation + Experiments: Verify formula

Liquid friction: $f = \frac{1}{2}\rho C v_s^2$

Pendulum period: $T = 2\pi \sqrt{\frac{I}{mgL}}$



RESEARCH PROCESS

➤ Basic assumptions

- Cross area: a square
- g value constant
- No extension
- Be soaked in liquid
- No rolling friction
- Same type of liquid: water

➤ Research method

- Quantitative research, Control Variables Method

➤ Resource needed

- Mainly from websites



RESEARCH PROCESS

- **1. Read papers.**
- **2. Deduce formula.**
 - extreme, normal, and boundaries
- **3. Experiment.**
 - Design, list cautions
- **4. Analyze data.**
 - plot data, draw formula answers, compare
- **5. Conclude.**
 - Mistakes? How to improve?



TIMELINE

2023.09-10:

Collect references,
work out the first
version of formula
about the pendulum

2023.12-24.01:

Design experiment,
make theoretical
expectations, calculate
various answers

2024.03-04:

Analyze data, finish
the essay, submit to
tutor for final revision

2023.07-08:

Determine research
topic, make the first
step to the question,
have a basic
understanding

2023.11-12:

Study how to plot graph
and how to meet the
needs of experiments(e.g.
python+3d design)

2024.01-02:

Complete experiment,
check if any mistakes,
Draw graphs and
compare the
expectations with reality



光華劍橋
Guanghua Cambridge School

Thank you for your listening

上海光華學院劍橋國際中心
Guanghua Cambridge International School