GEN 280: Technical Reports

Week 2: Writing the Introduction

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Lecture Outline:

1. What is LaTeX?
2. Introducing your report.
3. Reviewing the literature.
4. Outlining the aim and objectives.

Table of Contents

What is LaTeX

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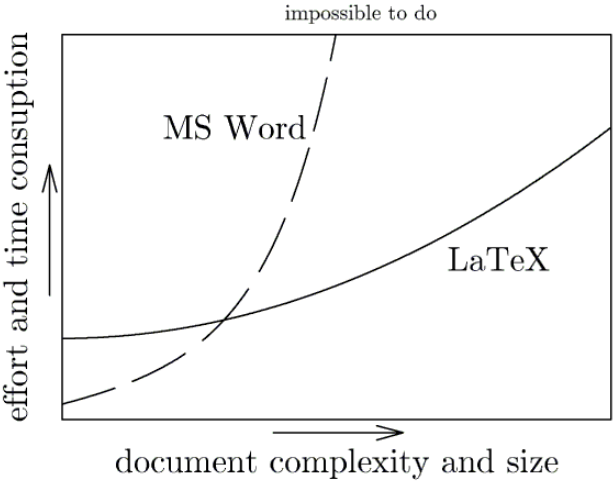
- LaTeX, which is pronounced 'Lah-tech' or 'Lay-tech', is a **document preparation system** for high-quality typesetting.
- It is most often used for medium-to-large technical or **scientific documents**.
- LaTeXis **not a word processor**!
- Instead, LaTeX encourages authors **not to worry too much about the appearance of their documents** but to concentrate on getting the right content.

Why LaTeX

- It makes beautiful documents, especially mathematics.
- It was created by scientists, for scientists.
- Make it easy to change from one document template to another.



Why LaTeX

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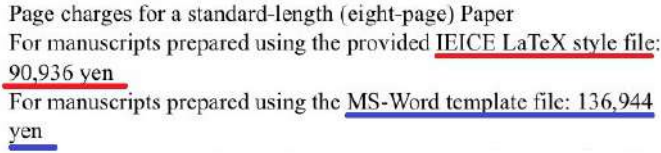
- Make it easy to change from one document template to another.
- Cheaper!



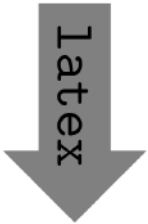
Page charges for a standard-length (eight-page) Paper
For manuscripts prepared using the provided IEICE LaTeX style file: 90,936 yen
For manuscripts prepared using the MS-Word template file: 136,944 yen

IEICE Transactions

How does LaTeX work?

- You write your document in **plain text** with **commands** that describe its structure and meaning.
- The LaTeX program processes your text and commands to produce a beautifully formatted document.
- The author focuses on '**what it is**', not '**how it looks**' and LaTeX will do the job!

```
This is an example of \textbf{bold}
text with \textit{italic} word
```



This is an example of **bold** text with *italic* word

How does LaTeX work?

More examples:

```
\begin{itemize}
\item Tea
\item Milk
\item Biscuits
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How does LaTeX work?

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```

```
\begin{equation}
\alpha + \beta + 1
\end{equation}
```

$$\alpha + \beta + 1 \quad (1)$$

Table of Contents

Introducing your report.

Setting the scene.

Your introduction should contain:

- The necessary context for reading and understanding the rest of the material.

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- A review of the background literature.
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- The specific problem that you are investigating.

The best way is to consider these questions:

- Is the problem clearly defined?
- Have you explained why the problem is interesting?
- Are the foundations of the work explained?
- What have other people done in this area?

Introducing your report.

An engineering example: Introducing the experiment.

We investigated the effect of temperature on the **impact toughness** of steel using the Charpy impact test.

Introducing your report.

An engineering example: Introducing the experiment.

Would the following information be suitable for an Introduction section?

Example one:

Samples of the metal under consideration will be fractured using a Charpy impact tester. The Charpy tester was developed in the 1940s and can be used to test samples of metal as well as a variety of other materials. This test has the advantage of being relatively cheap and quick to perform.

Introducing your report.

An engineering example: Introducing the experiment.

Would the following information be suitable for an Introduction section?

Example two:

There are differences between the results obtained from the experiment and those predicted. A potential cause the discrepancy is the change of sample temperature during transit from the thermal environment to the Charpy machine and during the setup of the test.

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Reviewing the literature.

A literature review

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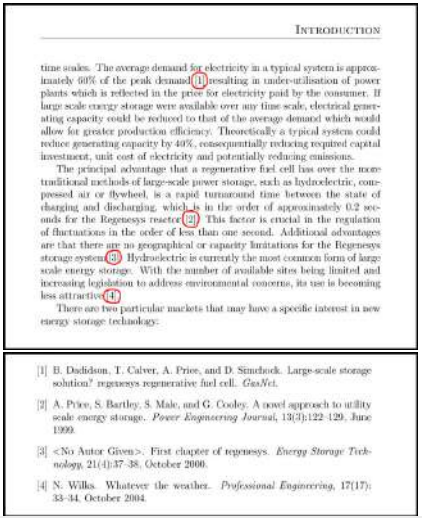
Finding the right information

To find the right information, you need to use **keyword searches**, who wrote the article, and

Reviewing the literature.

Citation and referencing

When writing a report, you need to distinguish between your work, and work taken from other authors. Use citations to cite other's sources.



INTRODUCTION

time scales. The average demand for electricity in a typical system is approximately 60% of the peak demand [1] resulting in under-utilisation of power plants which is reflected in the price for electricity paid by the consumer. If large scale energy storage were available over any time scale, electrical generating capacity could be reduced to that of the average demand which would allow for greater production efficiency. Theoretically a typical system could reduce generating capacity by 40%, consequentially reducing required capital investment, unit cost of electricity and potentially reducing emissions.

The principal advantage that a regenerative fuel cell has over the more traditional methods of large-scale power storage, such as hydroelectric, compressed air or flywheel, is a rapid turnaround time between the state of charging and discharging, which is in the order of approximately 0.2 seconds for the Regenesys reactor [2]. This factor is crucial in the regulation of fluctuations in the order of less than one second. Additional advantages are that there are no geographical or capacity limitations for the Regenesys storage system [3]. Hydroelectric is currently the most common form of large scale energy storage. With the number of available sites being limited and increasing legislation to address environmental concerns, its use is becoming less attractive [4].

There are two particular markets that may have a specific interest in new energy storage technology:

[1] B. Dadidson, T. Calver, A. Price, and D. Simchock. Large-scale storage solution? regenesys regenerative fuel cell. *GasNet*.

[2] A. Price, S. Bartley, S. Male, and G. Cooley. A novel approach to utility scale energy storage. *Power Engineering Journal*, 13(3):122–129, June 1999.

[3] <No Autor Given>. First chapter of regenesys. *Energy Storage Technology*, 21(4):37–38, October 2000.

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Reviewing the literature.

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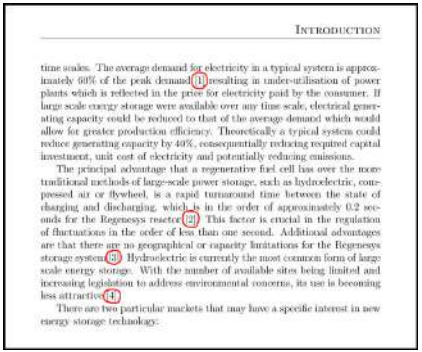
IEEE referencing style

[No.] Initial(s). Surname and initial(s) Surname, Title, ed. (if not first edition) City of publisher, U.S. State if necessary, Country: Publisher, year.

Example:
Reference: [1] J. A. Duffie and W. A. Beckman. Solar Engineering of Thermal Processes. New York: Wiley-Interscience, 1980.



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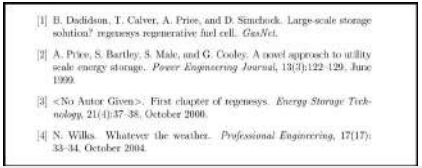

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Reviewing the literature.

Avoiding Plagiarism

- Plagiarism is using ideas or words from another person and submitting it as your own.
- Always paraphrase other's words. [QuillBot's paraphrasing tool]

Table of Contents

Outlining the aim and objective.

Aim and Objectives

The **aim** is your **overall intention for the project**. The **objectives** are **the specific steps** you will take to get there.

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Example

Aim

"The aim of this experiment was to determine how the elastic behaviour of a piece of bungee cord varied with applied load".

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Aim

"The aim of this experiment was to determine how the elastic behaviour of a piece of bungee cord varied with applied load".

Objectives

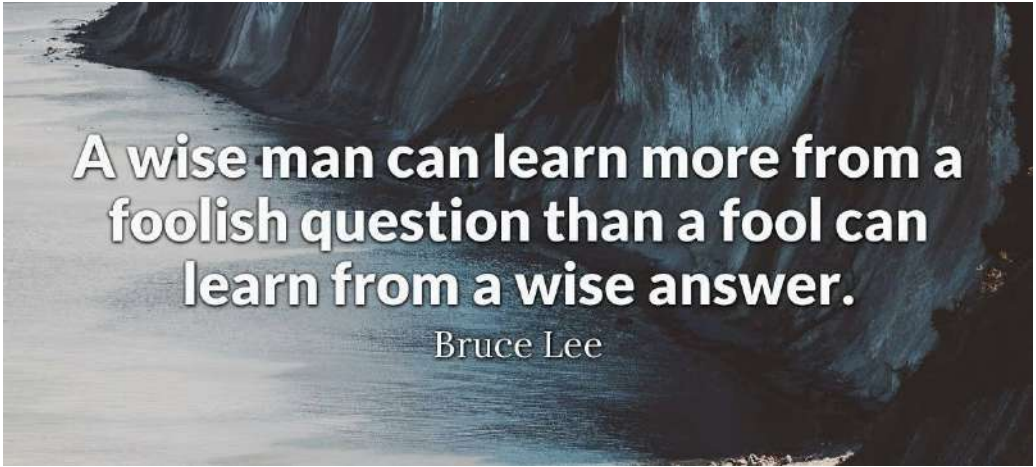
The objectives of this research are:

1. To examine the relationship between spring constant and applied load.
2. To calculate the natural frequency from spring constant values, at various loads.
3. To compare an experimental value of natural frequency with a predicted value.

Summary: Structurin your introduction

	FUNCTION	AUTHOR'S TEXT
1	definition of the topic plus background	An XYZ battery is a battery that ... The electrodes in an XYZ telephone battery are made of a composite of gold and silver, coated with a layer of platinum. The gold and silver provide structural support, while the platinum provides resilience.
2	accepted state of the art plus problem to be resolved	The performance of the battery can be strongly affected by the number of times the battery is recharged and the duration of each individual recharge. The battery is subject to three possible failure modes. ...
3	authors' objectives	A research program has recently been started by the authors in collaboration with a major battery manufacturer, with the goal of developing new design models for XYZ batteries. Analytical techniques are needed that can predict ...
4	introduction to the literature	Computational techniques have been extensively applied to the study of the lifetime of XYZ batteries, in particular with regard to the number of times a battery is charged. However, little research to date has focused on the length of each individual recharge.
5	survey of pertinent literature	More recent research has occurred in the field of laptop and jPud batteries. Evans [15] studied the lifetime in 5G jPud batteries. Smith [16] and Jones [18] found that ... However their findings failed to account for ...
6	authors' contribution	To the best of our knowledge there are no results in the literature regarding how the length of each recharge impacts on the silver and gold in the electrodes.
7	aim of the present work	The aim of the present work is to construct a model to perform a comprehensive investigation of the effect of recharging on the electrodes, and to find a new proportion in the amount of metals used. The assumptions of Smith [16] and Jones [18] are used as a starting point. ...
8	main results / conclusions	The results of the model are encouraging and show that ...
9	future implications	This new model will be able to ...
10	outline of structure	Section 2 introduces the concept of ...

Questions?



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