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HARNESSING HYDROELECTRIC POWER USING VERTICAL AXIS TURBINE

By
Mr. XYZ



National Institute of Technology Arunachal Pradesh

(Established by Ministry of Education, Govt. of
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Pradesh - 791 113

May, 2022

HARNESSING HYDROELECTRIC POWER USING VERTICAL AXIS TURBINE

(EE-802)

(For PG/PhD subject code not required)

Thesis

*Submitted in partial fulfillment of the
requirements for the award of degree of*

Bachelor/Master of Technology

or

Doctor of Philosophy

By

Mr. XYZ

(Registration number)

Under the supervision of:

Dr. ABC

Assistant Professor

Department of Electrical Engineering



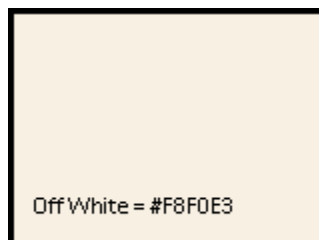
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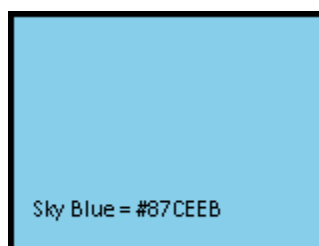
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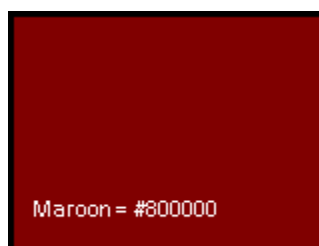
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ACKNOWLEDGEMENT

I take this opportunity to express my heartfelt gratitude and sincere thanks to my project supervisor -----, Assistant Professor , Department of -----, National Institute of Technology, Arunachal Pradesh for his constant guidance, suggestion and gracious encouragement at my very crucial stage of this dissertation work without which it could not become successful.

I would also like to acknowledge Dr. _____ for his valuable suggestion constant guidance and also for kind cooperation during the course of the entire project works. I am also grateful to Dr. _____ for their valuable supports whenever required.

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ABSTRACT

Font size 12, Times New Roman

Key Words: 4 to 8 is allowed separated by semicolon

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LIST OF NOTATIONS

[illegible]

ACRONYMS

FACTS	- Flexible AC Transmission System
OH	- Over Head
UPFC	- Unified Power Flow Controller
VSC	- Voltage Source Converter
TCR	- Thyristor –Controlled Reactor
TSR	- Thyristor – Switch Reactor
STATCOM	- Static Synchronous Compensator
SSC	- Static Series Compensator
TCSC	- Thyristor Controlled series Compensator
GTO	- Gate Turn Off
PAR	- Phase Angle Regulator
PST	-Phase Shifting transformer
IPFC	- Interline power flow Controller
OLTC	- On Load Tap Changer
LF	- Load Flow
PWM	- Pulse Width Modulation
PAR	- Phase Angle Regulator
PST	-Phase Shifting transformer
IPFC	- Interline power flow Controller
OLTC	- On Load Tap Changer
LF	- Load Flow
PWM	- Pulse Width Modulation

GUIDELINES FOR PREPARATION OF THESIS FORMAT

The thesis manuscript has three basic parts: the preliminary pages, the text and the reference materials.

Preliminaries

The preliminary materials consist of the Title Page, Thesis Certificate, Abstract, Dedication (optional), Acknowledgements, Table of contents, List of tables, List of figures and other lists. Preliminary pages are paginated separately from the rest of the text. The title page is counted, but it is not numbered. Beginning with the page immediately following the title page, place page numbers in lowercase Roman numerals centered at the bottom of the preliminary pages. The Roman numerals are continued up to the first page of the text.

Proper Order of Preliminary Pages:

1. Title Page

The title of the thesis should be as concise as possible. It must occur consistently in every respect, including punctuation, capitalization, and hyphenation, on the abstract and approval forms. On the title page, the identical title must appear in all capital letters with each line centered on the page. The month in which the thesis is submitted, e.g., May, August, or January is to be printed at the bottom of the page. The title page is not numbered, but it is counted.

2. Abstract

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3. Dedication (optional)

The dedication is brief, single-spaced, and centered on the page (horizontally and vertically). No heading is used. The word "To" customarily begins the dedication.

4. Acknowledgement

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This page is used to thank those persons who have been instrumental to the student in completing the degree requirements. Acknowledgement of grants and special funding received to support the research also may be made on this page.

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8. Other Lists (nomenclature, definitions, glossary of terms, etc.)

The appropriate title in all capital letters is centered two inches from the top of the first page only.

PAGE DIMENSIONS AND MARGIN

The thesis should be prepared on good quality white paper preferably not lower than 80 gsm. Standard A4 size (210 mm X 297 mm) paper should be used for preparing the copies. The final thesis should have the following page margins:

Top edge : 1 inch (25 mm)

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TYPE-SETTING, TEXT PROCESSING AND PRINTING

The text shall be printed employing Laserjet or Inkjet printer, the text having been processed using a standard text processor. The standard font shall be Times New Roman of 12 pts with

1.5 line spacing. The text must be 1.5 lines spaced and printed on only one side of each page.

Text

The text must be divided into a logical scheme that is followed consistently throughout the document. The larger divisions and more important minor divisions are indicated by suitable, consistent headings. Chapter organization as practiced by the discipline should be followed. The student and the academic department are responsible for the quality and content of the text. Specific requirements for text presentation is given below.

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1. Chapter and Section format

The title of **Chapter 1** shall be **Introduction**. It shall justify and highlight the problem poser and define the topic and the aim and scope of the work presented in the thesis. It may also highlight the significant contributions from the investigation.

Use only Arabic Numerals. Chapter Numbering should be centered on the top of the page using large bold print.

Example:

CHAPTER 1

Sections

A chapter can be divided into **Sections, Sub-sections and Sub-sub-sections** so as to present different concepts separately. Sections and sub-sections can be numbered using decimal points, e.g., 2.2 for the second Section in Chapter 2 and 2.3.4 for the fourth Sub-section in third Section of Chapter 2. Use only Arabic Numerals with decimals. Section numbering should be left justified using large bold print.

Example:

1.1 GENERAL

1.2 ADSORPTION

Sub Sections

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Example:

1.1.1 Adsorption Isotherms

1.1.2 Langmuir Isotherms

etc.

2. Review of Literature

This shall normally be the **Chapter 2** and shall present a critical appraisal of the previous work published in the literature pertaining to the topic of the investigation. The extent and emphasis of the chapter shall depend on the nature of the investigation.

For Example,

Several researchers attempted to develop mathematical models to simulate the activated sludge process. Some of these models simulate the organic removal mechanisms in wastewater treatment field, which were included in Jorgensen and Gromiec (1985), Henze (1986), Henze et al. (1987a), Tang et al. (1987), and Van Niekerk et al. (1988). The oxygen transfer mechanism has an important place in the activated sludge process. An estimation technique for the oxygen transfer capacity is investigated by Stenstrom et al. (1989).

3. Results and Discussions

This shall form the penultimate chapter of the thesis and shall include a thorough evaluation of the investigation carried out and bring out the contributions from the study. The discussion shall logically lead to inferences and conclusions as well as scope for possible further future work.

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Equations

All the equations should be typed in equation editor and should be properly numbered

For Example,

$$\Delta X \propto X \Delta t$$

(2.1)

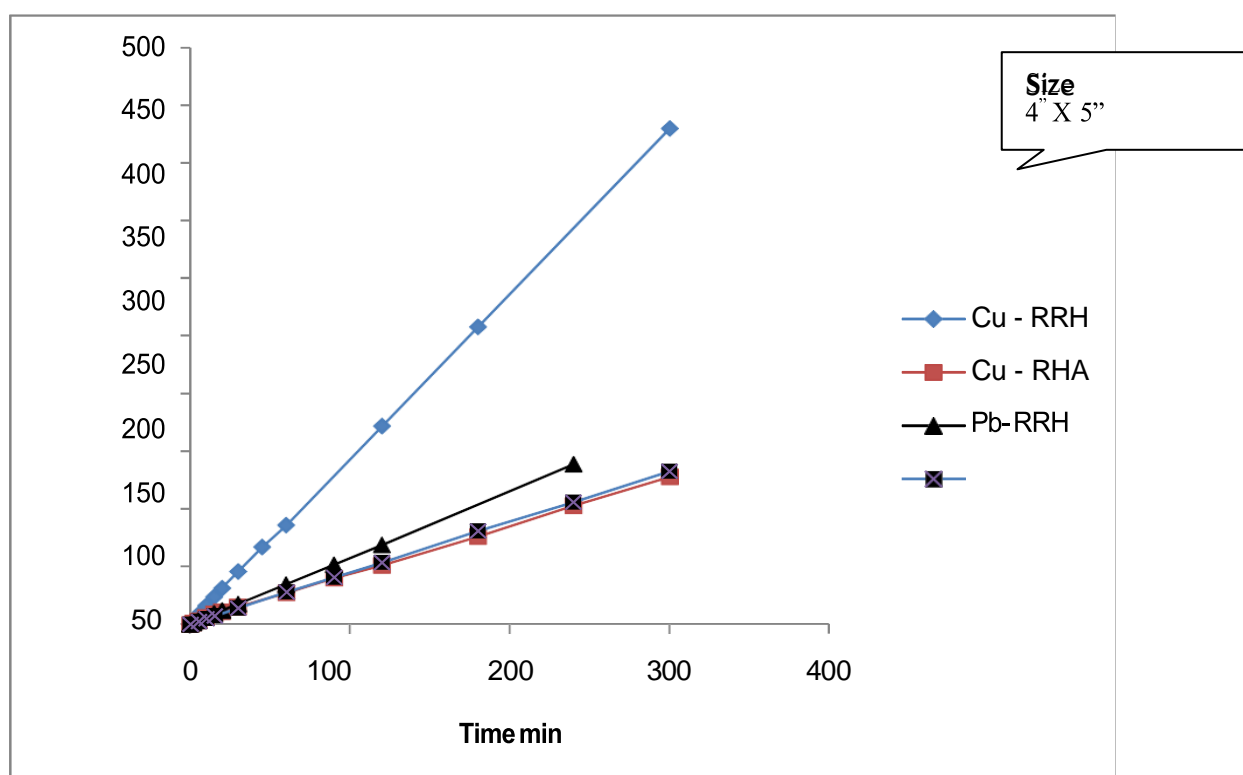


Fig. 10. Pseudo Second order plot for Copper and Lead on RRH and RHA

Table 5 Desorption Study

Cycle	Metal/ Adsorbent	Copper		Lead	
		RRH	RHA	RRH	RHA
1	Adsorption	73%	97.5%	81%	98%
	Desorption	99%	99.5%	98.5%	99%
2	Adsorption	40%	30%	80%	38%
	Desorption	99%	99%	98%	99%

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References

1. For single author

Bruce Rittmann, E. (1996) How input biomass affects sludge age and process stability.
ASCE: Jour.Env.Engg, **122**, 4-8.

2. Papers with Two Authors,

Bliss, P. J. and D. Barnas (1986) Modeling Nitrification in Plant Scale Activated Sludge.
Water Science and Technology, **18**,139-148.

3. Papers with more than two Author,

Capodaglio, A.G., H.V. Jones, V. Novotny and X. Feng (1991) Sludge bulking analysis and forecasting: application of system identification and artificial neural computing technologies. *Water Res.*, **25**, 1217–24.

4. Books

APHA, AWWA and WPCF *Standard methods for the examination of water and wastewater*, 17th Edition, Washington, D.C.: American Public Health Association, 1989.

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