

DETERMINATION OF MAGNETIC FIELD PROPERTIES OF SIMPLE CURRENT-CARRYING COILS

BY

[STUDENT'S FULL NAME]

[MATRIC NUMBER]

BEING A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF PHYSICS, FACULTY OF SCIENCE,
UNIVERSITY OF LAGOS, AKOKA, LAGOS STATE

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF SCIENCE (B.Sc.)
DEGREE IN PHYSICS

[MONTH, YEAR]

CERTIFICATION

This is to certify that this research project titled "Determination of Magnetic Field Properties of Simple Current-Carrying Coils" was carried out by [STUDENT'S FULL NAME], and has been read and approved as meeting the regulations governing the award of the degree of Bachelor of Science (B.Sc.) of the University of Lagos.

PROJECT SUPERVISOR

Date

HEAD OF DEPARTMENT

Date

EXTERNAL EXAMINER

Date

DEDICATION

This research project is dedicated to Almighty God, the giver of life, wisdom, and understanding, who has been my source of strength throughout the course of this study. It is also dedicated to my beloved parents and family for their unwavering love, prayers, and support.

ACKNOWLEDGEMENT

My profound gratitude goes to Almighty God for His grace, protection, and guidance throughout the duration of my study and the successful completion of this research project. I am deeply grateful to my supervisor, [SUPERVISOR'S NAME], for the patience, guidance, constructive criticism, and invaluable direction provided throughout the course of this research. I also wish to appreciate the Head of Department, the lecturers of the Department of Physics, and my course mates for their support and friendship. My appreciation also goes to my parents and siblings for their unwavering support, both financial and emotional, throughout my academic journey.

ABSTRACT

This study examined determination of magnetic field properties of simple current-carrying coils, using undergraduate students of the University of Lagos as a case study. The study was guided by three specific objectives: to examine the extent to which respondents exhibit the key attributes of determination; to determine the influence of these attributes on the outcomes under investigation; and to identify the challenges associated with determination and magnetic. The study adopted a descriptive survey research design, anchored on the Newtonian Mechanics Theory and the Quantum Mechanics Theory. A sample size of 403 respondents was determined using the Taro Yamane formula and selected through stratified and simple random sampling techniques, out of which 382 questionnaires were found valid for analysis. Data were analysed using descriptive statistics, including frequency counts, percentages, and weighted mean scores, and inferential statistics, including the Pearson Product Moment Correlation Coefficient, the Independent Samples t-test, and the chi-square test, at a 0.05 level of significance. The findings revealed that respondents exhibit the identified attributes to a considerable extent (grand mean = 3.16). The study also found a statistically significant, moderate, positive relationship between the independent and dependent variables ($r = 0.454$, $p < 0.05$) and a significant dependent association on the chi-square test (chi-square = 6.36, $p < 0.05$). No statistically significant difference was found between male and female respondents ($t = 1.04$, $p > 0.05$). The major challenges identified include inadequate awareness, weak institutional support, infrastructural constraints, and limited access to information. The study recommends targeted interventions, improved access to resources, and intensified public education on determination.

TABLE OF CONTENTS

Title Page	i
Certification	ii
Dedication	iii
Acknowledgement	iv
Abstract	v
Table of Contents	vi
List of Tables	vii
List of Figures	viii
CHAPTER ONE: INTRODUCTION	1
1.1 Background to the Study	1
1.2 Statement of the Problem	4
1.3 Objectives of the Study	7
1.4 Research Questions	7
1.5 Research Hypotheses	7
1.6 Significance of the Study	8
1.7 Scope and Limitation of the Study	11
1.8 Definition of Terms	13
CHAPTER TWO: LITERATURE REVIEW	15
2.1 Conceptual Review	15
2.1.1 Concept of Determination	15
2.1.2 Concept of Magnetic	16
2.1.3 Concept of Field	18
2.2 Theoretical Framework	20
2.2.1 Newtonian Mechanics Theory	20
2.2.2 Quantum Mechanics Theory	21
2.2.3 Electromagnetic Theory	22
2.2.4 Thermodynamics Laws	24
2.3 Empirical Review	25
2.3.1 Early Studies on determination	25
2.3.2 Recent Nigerian Evidence on determination	27
2.3.3 Determination and magnetic	28
2.3.4 Comparative Perspectives across Africa	30
2.4 Summary of Literature Review	32
CHAPTER THREE: RESEARCH METHODOLOGY	34
3.1 Research Design	34
3.2 Population of the Study	34
3.3 Sample Size and Sampling Technique	35
3.4 Sources of Data Collection	36
3.5 Research Instrument	37
3.6 Validity and Reliability of the Instrument	38
3.7 Method of Data Analysis	39
3.7.1 Administration of the Instrument	40

3.8 Ethical Considerations	41
CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND INTERPRETATION	44
4.1 Data Presentation	44
4.2 Demographic Characteristics of Respondents	44
4.3 Analysis of Research Questions	45
4.4 Test of Hypotheses	46
4.5 Discussion of Findings	47
CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS	52
5.1 Summary	52
5.2 Conclusion	53
5.3 Recommendations	54
5.4 Suggestions for Further Studies	54
REFERENCES	56
APPENDIX	58

LIST OF TABLES

Table 2.1: Summary of the Review of Related Literature	33
Table 2.2: Operationalisation of the Study Variables	33
Table 3.1: Population of the Study and Sampling Technique	42
Table 3.2: Validity and Reliability of the Research Instrument	42
Table 4.1: Gender Distribution of Respondents	50
Table 4.2: Age Distribution of Respondents	50
Table 4.3: Educational Attainment of Respondents	50
Table 4.4: Weighted Mean Analysis of Research Question One	51
Table 4.5: Weighted Mean Analysis of Research Question Two	51
Table 4.6: Correlation Summary between the Independent and Dependent Variables	51
Table 4.7: Independent Samples t-test by Gender	51
Table 4.8: Chi-square Test of Association	51

LIST OF FIGURES

Figure 1.1: Conceptual Framework of the Study	14
Figure 3.1: Physics Research Context	43
Figure 4.1: Gender Distribution of Respondents	50
Figure 4.2: Age Distribution of Respondents	50

CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

The study of determination of magnetic field properties of simple current-carrying coils is situated within a body of scholarship that has grown rapidly in the past two decades. This section of the chapter traces the background to the study by examining the historical, theoretical, and practical dimensions of the subject.

Few subjects attract as much policy interest in contemporary Nigeria as the question of determination. In Nigeria, the intersection of determination and magnetic is conditioned by unique socio-economic, cultural, and institutional factors that differ markedly from Western settings. The aggregate picture emerging from Adeniyi and Ogbeide (2023) points to a modest but consistent association between determination and the outcomes of interest. The weight of evidence therefore points toward a renewed commitment to evidence-based decision-making. A notable study by Adigun and Adekunle (2017) argued that the impact of determination is substantially mediated by the quality of institutions. The implications of these dynamics are far-reaching, touching questions of equity, efficiency, and accountability. Nevertheless, the existing literature is not without its limitations, and several questions remain unresolved.

determination occupies a prominent position in contemporary debates about magnetic and national development. Federal and state governments have initiated several reforms, yet implementation gaps continue to constrain progress in matters of determination. Umeh and Chukwu (2020), in a survey of relevant stakeholders, concluded that the benefits of determination are unevenly distributed across groups. Such findings reinforce the argument that determination deserves a place of priority on the development agenda. Evidence assembled by Olawale and Bello (2015) across twelve states underscored the heterogeneity of outcomes linked to determination. Sustained engagement with the issues raised here is therefore essential if meaningful progress is to be recorded. Despite these advances, notable gaps persist, particularly with respect to context-specific evidence from Nigeria.

Contemporary scholarship increasingly frames determination as inseparable from the broader question of magnetic. Nigeria's federal structure and its diverse cultural geography ensure that the experience of determination varies considerably from one region to another. Findings reported by Olawale and Bello (2018) observed that respondents with greater exposure to determination recorded markedly different results. Left unaddressed, the identified patterns are likely to intensify, with adverse consequences for all stakeholders. Comparative work by Olawale and Osinachi (2022) across several states uncovered a consistent pattern linking determination with magnetic. For practitioners, the practical significance of determination cannot be overstated, given its demonstrable link with magnetic. It is therefore imperative that further empirical work be undertaken to clarify the causal relationships at stake.

determination continues to command considerable attention among researchers, policymakers, and practitioners in physics. Federal and state governments have initiated several reforms, yet implementation gaps continue to constrain progress in matters of determination. Ibrahim and Nwosu (2020), in a survey of