

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangama, Belagavi – 590018



Main Project Report On

“FAULT DETECTION IN IEEE 9 BUS SYSTEM USING MATLAB & SIMULINK”

Submitted in partial fulfilment of the requirement for the award of degree of

BACHELOR OF ENGINEERING
UNDER
VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Submitted by:

BHUMIKA K RAMESH
VISHAL G
VIVEK N
JYOTI

1RR21EE004
1RR21EE013
1RR21EE014
1RR22EE408

Under the guidance of:

KIRUTHIKA K
Assistant Professor
Dept. of EEE

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING



RAJARAJESWARI COLLEGE OF ENGINEERING

[NBA & NAAC Accredited, affiliated to VTU, Belagavi, Approved by AICTE, New Delhi]

#14, Ramohalli Cross, Mysore Road, Kumbalagodu, Bengaluru-74

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[NBA & NAAC Accredited, affiliated to VTU, Belagavi, Approved by AICTE, New Delhi]

#14, Ramohalli Cross, Kumbalgodu, Mysore Road, Bangalore-560074

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING



CERTIFICATE

This is to certify that the project work entitled **“FAULT DETECTION IN IEEE 9 BUS SYSTEM USING MATLAB & SIMULINK”** is a bonafide work carried out by **BHUMIKA K RAMESH (1RR21EE004), VISHAL G (1RR21EE013), VIVEK N (1RR21EE014), JYOTI (1RR21EE408)** in partial fulfillment for the award of **Bachelor of Engineering in Electrical and Electronics Engineering** of the **Visvesvaraya Technological University, Belagavi** during the year 2024-2025. It is certified that all corrections & suggestions indicated for internal assessment have been incorporated in the report & deposited in the departmental library. The main project report has been approved as it satisfies the academic requirements.

Signature of the Guide

Prof. Kiruthika K

Signature of HOD

Dr. P Ebby Darney

Signature of the Principal

Dr. Balakrishna R

Name of the Examiners:

1. _____

2. _____

Signature with date:

DECLARATION

We, **BHUMIKA K RAMESH (1RR21EE004), VISHAL G (1RR21EE013), VIVEK N (1RR21EE014), JYOTI (1RR21EE408)** students of 7th semester BE in Electrical and Electronics Engineering, **RajaRajeswari College of Engineering, Bengaluru** hereby declare that the project work entitled **“FAULT DETECTION IN IEEE 9 BUS SYSTEM USING MATLAB & SIMULINK”** submitted to the **Visvesvaraya Technological University** during the academic year 2024-25, is a record of an original work done by us, under the guidance of **Kiruthika K**, Assistant Professor, Electrical and Electronics Engineering, RajaRajeswari College of Engineering, Bengaluru. This project is submitted in partial fulfilment of the requirements for the award of the degree of Bachelor of Engineering in Electrical and Electronics Engineering. The results embodied in this have not been submitted to any other University or Institute for the award of any degree.

NAME OF THE STUDENTS:

BHUMIKA K RAMESH (1RR21EE004)

VISHAL G (1RR21EE013)

VIVEK N (1RR21EE014)

JYOTI 1RR21EE408)

DATE:

PLACE: BENGALURU

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CONTENTS

CERTIFICATE	ii
DECLARATION	iii
ACKNOWLEDGMENT	iv
CONTENTS	v
LIST OF FIGURES	vi
ABSTRACT	vii
CHAPTER 1: INTRODUCTION	1
1.1: INTRODUCTION	1
1.2: LITERATURE SURVEY	2
1.3: OBJECTIVE OF PROJECT	5
1.4: OVERVIEW OF PROJECT	6
CHAPTER 2 : HARDWARE OF FAULT DETECTION IN IEEE 9 BUS SYSTEM USING MATLAB & SIMULINK	7
2.1: BLOCK DIAGRAM	7
2.2: COMPONENTS REQUIRED	8
2.3: CIRCUIT DIAGRAM	14
2.4: METHODOLOGY	15
CHAPTER 3 : SOFTWARE-MATLAB	16
3.1: MATLAB	16
3.2: SIMULINK	17
CHAPTER 4 : RESULTS & DISCUSSIONS	18
4.1: RESULT	18
4.2: CONCLUSION	22
4.3: FUTURE SCOPE	23
CHAPTER 5 : ADVANTAGES AND DISADVANTAGES	24
5.1: ADVANTAGES	24
5.2: DISADVANTAGES	25
CHAPTER 6 : APPLICATIONS	26
CONCLUSION	27
REFERENCE	28
ANNEXURE	29

LIST OF FIGURES

Fig 2.1: Block Diagram of Fault Detection In IEEE 9 Bus System Using MATLAB & Simulink	7
Fig 2.2.1.1 :Arduino Uno	8
Fig 2.2.2.1: Dc Current & Voltage Indicator	10
Fig 2.2.3.1: 4 Channel Relay Module	11
Fig 2.2.4.1: OLED Display	11
Fig 2.2.5.1: Rectifier Module	12
Fig 2.2.6.1: 4 Channel Relay Module	13
Fig 2.2.7.1: Bulb Holder	13
Fig 2.3: Circuit diagram Fault Detection in 2 Bus System	14
Fig.4.1.1 IEEE 9 Bus System	18
Fig 4.1.2 Voltage Characteristics of The Line – Ground Fault	19
Fig.4.1.3 Current Characteristics of The Line – Ground Fault	20
Fig.4.1.4 Voltage Characteristics of the Double Line – Ground Fault	21
Fig.4.1.5 Current Characteristics of the Double Line – Ground Fault	21
Fig.4.1.6 Current Characteristics of the Line-Line – Ground Fault	22
Fig.4.1.7 Voltage Characteristics of the Line – Ground Fault	23
Fig 4.1.8 Hardware Result	24
Fig.4.1.9 Hardware Result of Line to Ground Fault	24
Fig 4.1.10 Hardware Result of Line- Line Fault	25
Fig.4.1.11 Fault detected in Bus 1	26
Fig.4.1.12 Fault detected in Bus 2	27

ABSTRACT

This project presents a fault detection methodology for the IEEE 9-bus system using MATLAB and Simulink. The IEEE 9-bus system is a well-established testbed for studying power system stability and fault analysis due to its complexity and interconnectivity. In this study, various types of faults, including single-line-to-ground (SLG), line-to-line (LL), double-line-to-ground (DLG), and three-phase faults, are simulated and analyzed.

The primary objective is to develop a fault detection mechanism that accurately identifies and classifies fault types, location, and severity within the network. The system dynamics are modeled using MATLAB's Simulink environment, leveraging the capabilities of the Sim Power Systems toolbox for power systems simulation. The proposed fault detection algorithm employs wavelet transforms and signal processing techniques to analyze the transient response during fault conditions. By examining voltage and current waveforms at critical nodes, the algorithm pinpoint's fault locations and classify fault types based on characteristic transient features.

The findings of this research are essential for advancing the reliability of protection systems, as the early detection of faults minimizes system downtime and ensures stable power delivery. The project concludes with a performance analysis of the fault detection approach, illustrating its effectiveness and accuracy across different fault scenarios in the IEEE 9-bus model.