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

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

This is to certify that the project work entitled **"FAULT DETECTION IN IEEE 9 BUS SYSTEM USING MATLAB & SIMULINK"** is a bonafide work carriedout by **BHUMIKA K RAMESH (1RR21EE004), VISHAL G (1RR21EE013), VIVEK N (1RR21EE014), JYOTI (1RR21EE408)** in partial fulfilment 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 itsatisfies the academic requirements.

Signature of the Guide	Signature of HOD	Signature of the Principal
Prof. Kiruthika K	**Dr. P Ebby Darney**	**Dr. Balakrishna R**

Name of the Examiners: **Signature with date:**

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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.

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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.