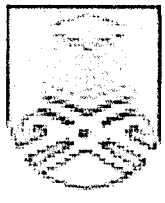
# SIMULINK MODEL FOR OUTAGE STUDIES IN POWER TRANSMISSION SYSTEM

This thesis is presented in partial fulfillment for the award of the Bachelor of Electrical Engineering (Hons.) Universiti Teknologi MARA.

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# ABSTRACT

This thesis presents the simulink model for outage studies in a power transmission system. The study involved the development of simulink model for all necessary components in power system. Consequently, several outages considering line or generator outages were performed on the system, to evaluate the impacts of these events to system stability. In realizing the possible events, an IEEE 9-bus system was utilized as the test specimen. Responses for voltage, current and active and reactive power profiles were monitored with and without line and generator outages.

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# CHAPTER 1

# INTRODUCTION

## 1.0 Introduction

The steady state operating mode of a power system is balanced 3-phase ac. However due to sudden external or internal changes in the system, this condition is disrupted. When the insulation of the system fails at one or more points or a conducting object comes in with a live point, a short circuit or fault occurs. The causes of faults are numerous lightning, heavy winds, trees falling across lines and other. A fault involving all the three phases is known as symmetrical (balanced) fault while one involving only one or two phases is known as unsymmetrical (unbalance) fault. Single line to ground, line to line and double line to ground faults are known as unsymmetrical faults [2].

The occurrence of fault will cause currents of high value to flow through the network to the faulted point. The amount of current may be much greater than the designed thermal ability of the conductors in the power lines or machines feeding the fault. As a result, temperature rise may cause damage by annealing of conductors and insulation charring. In addition, the low voltage in the neighborhood of the fault will cause equipment malfunction [3].

Several different research efforts have been made concentrated in the area of accurate network modeling for unbalance three-phase power system [12-15]. While each of the approaches is somewhat different, the final solutions to the network modeling problem always involve using phase-frame components.