

**FAULT CURRENT ANALYSIS CONSIDERING TRANSIENT IN
SYNCHRONOUS MACHINE**

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ABSTRACT

This paper presents a study of the fault currents analysis considering transient of the synchronous machine. The transient current for the synchronous machine were mathematically analyzed based on the two axis theory. The proposed methods were applied to the synchronous machine terminal. There are three types of fault which normally occur in the synchronous machine; balanced three phase fault, line to line fault and line to ground fault. The analysis and simulation was done using MATLAB R2006a Programming. The simulation results are tested on machine parameter which data is shown in the Appendix and machine parameter obtained from an experiment in the laboratory.

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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

The synchronous machine is an essential component of a power system. It allows conversion from mechanical energy to electrical energy or vice versa. It is a device that works in synchronism with the rest of the electrical network [1]. However, when a disturbance is applied, the machine behavior can be quite different. A transient period of readjustment occurs between the initial and final steady-state operating conditions. In many applications, it is necessary to know the behavior of the machine (i.e. its response to the disturbance during this transient period) [2]. In this paper, the electrical transient behavior of synchronous machine are studied.

Synchronous machines are used primarily as generators, either supplying power to an individual load or connected to an infinite bus. A disturbance may occur in a synchronous machine in various ways. An accidental short circuit may occur between line and ground, between line and line, or between all three lines. Disturbance will cause electrical transients. The machine may even lose synchronism because of a disturbance. Transient phenomena in a synchronous machine are inherently very complex [2].

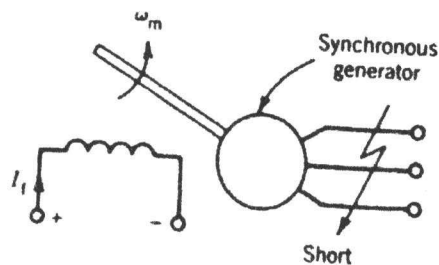


Figure 1.1: Schematic diagram of a synchronous generator with short on stator terminal.