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"TRANSIENT ANALYSIS OF TRANSMISSION
LINES BY SIMULATION"

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CHAPTER ONE

INTRODUCTION

Transients are fact of life on power system. Transients or surges causing overvoltages in the electrical power system. Surge may damage the transmission lines, transformers, generators, switch gears and other equipments in the system. Transient overvoltages are produced by the following factors:-

- a. lightning strokes - direct or indirect causing a surge on the line
- b. faulting or clearance of faults - overvoltages having a sustained effect
- c. switching - either by closing or opening of the circuit breaker.

The most important transients that occur in transmission lines is those caused by lightning which often struck the open wire line.

There are single-energy transients and double-energy transients. Single-energy transients are those in which only one form of energy, either electromagnetic or electrostatic is involved such as in R-L and R-C circuit. However, double-energy transients are those in which both electromagnetic or electrostatic is involved as in R-L-C circuit.

The transmission lines are used to transmit electrical energy and signals from one point to another. The basic transmission line connects a source to load. Transmission line consists of electrical parameters which are its series and shunt resistance, its series inductance (self and mutual) and its shunt capacitance. The inductance is due to the magnetic field set up by the line current. The capacitance and its charging current, are due to the electric field set up by the system voltage. Thus the transient analysis in the transmission lines is the study of behaviour of the transients of the parameters along the line.