DESIGN AND SIMULATION OF MULTIPLE IMPULSE GENERATION

by

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Report submitted in partial fulfillment
of the requirements for the degree
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“W*ithout friends no one would choose to live, though he had all other goods.”*

Aristotle (Greek Philosopher 384-322 B.C)

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DECLARATION SHEET

I hereby declare that my Final Year Project Thesis is the result of my research work under supervision of supervisor(s) name. All literature sources used for the writing of this thesis have been adequately referenced.

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REKAAN DAN SIMULASI GENERASI BERBILANG DEDENYUT

ABSTRAK

Kilat adalah sementara, mengeluarkan cas [1] arus yang tinggi yang menyebabkan peningkatan voltan. Kilat akan menghasilkan dedenyut, di mana ia mempunyai kesan pada sistem kuasa penghantaran dan peralatan. Voltan lebih dan arus lebih dihasilkan dari kejadian kilat yang bukan sahaja memberi kesan pada aliran kuasa tetapi juga pada voltan rendah seperti sistem telekomunikasi [2]. Projek ini menghasilkan gelombang dari kilat tunggal dan berbilang kilat menggunakan peranti perisian Pspice. Simulasi akan dibuat dengan menggunakan litar setara untuk dedenyut tunggal dan berbilang denyut. Untuk gelombang denyut tunggal, gelombang akan dijana mengikut cadangan standard voltan tinggi dedenyut (voltan dan arus dedenyut) IEC60060-1[3][6].

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DESIGN AND SIMULATION OF MULTIPLE IMPULSE GENERATION

ABSTRACT

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Lightning is a transient, high current discharge [1] that will cause steep build- up of voltage [7]. Lightning will generates impulses, which has a significant effect on power transmission system and equipment. The over-voltage or over-current resulting from a lightning incident will propagates not only into the power line but also into the low voltage line such as the telecommunication system [2]. This project presents the waveform of single and multiple impulse generation using PSpice software. The simulation will performed by using an equivalent circuit of an impulse generator for single impulse generation and using circuit of multiple impulses for multiple impulses generation. For single impulse waveform, the wave that will generated is follow by the standard high voltage impulse (voltage and current impulse), IEC60060-1[3][6].

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LIST OF SYMBOLS, ABBREVIATIONS OR NOMENCLATURE

IEC	International Electrotechnical Commission
μs	Micro seconds
L	Air cored high current inductor
R	Dynamic Resistor
C	Bank of Capacitor
G	Spark Gap
T_1	Front Time
T_2	Tail / fall time
DC	Direct Current
AC	Alternating Current
C_1	Stage Capacitor
C_2	Load Capacitor
R_1	Discharge Capacitor
R_2	Damping Resistor
S	Switching Gap
α	Front time
β	Fall time
i_2	Current through C_2
i_1	Current through C_1
Ω	Ohm
nF	Nano farad
pF	Pico farad
t_2	Duration for one half cycle of damped oscillatory wave
μH	Microhenry
μF	Microfarad
ms	Milliseconds
MOV	Metal Oxide Varistor

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