بسم الله الرحمن الرحيم

HOSSAM MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

HOSSAM MAGHRABY

شبكة المعلومات الجامعية

بعض الوثائق

الأصلية تالفة

HOSSAM MAGHRABY

MINUFIYA UNIVERSITY

Faculty of Engineering

Shebin El-Kom

MODELING AND CONTROL OF AN ISOLATED DIESEL GENERATING UNIT

By

ADEL MOHAMMED FATHY HAMMAD

A Thesis Submitted to

Faculty of Engineering at Minufiya University

For The Degree of M.Sc.

In

Electrical Engineering

Under the supervision of

Prof. Dr. Mohamed Talaat Fahim

M.T. Fah

Vice Dean of Faculty of Engineering

Tanta, Tanta University

Ass. Prof. Dr. Ezz El-Din Shaban Abdin

Abdin

Electrical Engineering Dept., Faculty of Engineering Shebin El-Kom

Minufiya University

Ass. Prof. Dr. Ashraf Salah El-Din Zein El-Din

Ash

Electrical Engineering Dept., Faculty of Engineering,

Shebin El-Kom, Minufiya University

2001 A. M. Kinawy

F.E. Kader

MINUFIYA UNIVERSITY

FACULTY OF ENGINEERING, SHEBIN El-KOM

DEPARTMENT OF ELECTRICAL ENGINEERING

"MODELING AND CONTROL OF AN ISOLATED DIESEL GENERATING UNIT"

A THESIS SUBMITTED BY

Eng. Adel Mohamed Fathy Hammad

B. Sc. (Eng.)1988

For The Award of the Degree of

M. Sc. In Engineering

In

"ELECTERICAL ENGINEERING"

EXAMINERS COMMITTEE

Prof. / M. M. ZAKARIA SHARF

(M-Sharaf)

Professor of Automatic Control

Faculty of Electronics Engineering, Menof

Minufiya University

Prof./ A. M. F. KINAWY

(A.M. Kinawy)

Professor of Electric Power Engineering

Faculty of Engineering. Shebin El-Kom

Minufiya University

Prof./ M. T. F. SAID-AHMED

Professor of Automatic Control

Vice dean of Faculty of Engineering, Tanta

Tanta University

Prof./ E. S. ABDIN

(Abdin)

Professor of Electrical Machines

Faculty of Engineering, Shebin El-Kom

Minufiya University

Head of the Department

(F.E. Kader)

Prof./ F. E. ABDEL-KADR

Dean

(A.M. Kinawy)

Prof./ SABRY A. MAHMOUD

2001

CONTENTS

LIST OF SYMBOLS

τ'_{do}	: Open circuit – direct axis transition time constant of the synchronous generator (sec)
τ''_{do}, τ''_{qo}	: Synchronous generator open circuit sub-transient time constants in the d and q axes respectively (sec)
τ_1	: Time delay due to the fuel combustion process (sec)
τ_2	: Electrical time constant of the diesel engine (sec)
φ	: Load power factor angle of the synchronous generator
δ	: Power angle of the synchronous Generator (radians)
r_a	: armature resistance of the synchronous generator (p.u)
R_L, X_L	: Load resistance and reactance respectively (p.u)
X_d, X_q	: Synchronous reactance in the d and q axes circuits of the synchronous generator respectively (p.u)
X''_d, X''_q	: Sub-transient reactance of the synchronous generator in the d and q axes circuits respectively (p.u)
I_L	: Load current (p.u)
V_t	: Terminal voltage of the synchronous generator (p.u)
E'_q	: The quadrature component of the synchronous generator transient voltage (p.u)

E''_d, E''_q	: The sub-transient voltages of the synchronous generator in the d and q axes respectively (p.u)
E_{fd}	: Synchronous – generator field voltage
P	: Active power of the synchronous generator
Q	: Reactive power of the synchronous generator
t_e, t_m	: Electrical and mechanical torque of the synchronous generator.
F_u	: Fuel rate of the diesel engine
Z	: The fuel rack value position
ω_o	: Name plate synchronous speed (rad/sec)
ω	: Angular speed of the synchronous generator
λ_d, λ_q	: Flux linkage of the synchronous generator in the d and q axes respectively (p.u)

LIST OF TABLES

LIST OF FIGURES