

CONTENTS

	Page
Acknowledgement	d
Abstract in Thai	e
Abstract in English	f
List of Tables	k
List of Figures	l
List of Abbreviations	p
List of Symbols	q
Statement of Originality in Thai	s
Statement of Originality in English	t
Chapter 1 Introduction	
1.1 Background	1
1.2 Generator systems	2
1.2.1 Generator systems with reduced-capacity converters	4
1.2.2 Generator systems with full-capacity converters	4
1.3 Control scheme for doubly-fed induction generator	5
1.4 Literature review	7
1.5 Thesis objectives	10
1.6 Outline of the thesis	11
Chapter 2 Hydroelectric Power Generation Systems and Experimental Rig	
2.1 Introduction	13
2.2 Hydroelectric power generation	13
2.3 Overall structure of the prototype system	15
2.4 Generator and prime mover	17

2.5	Power converter and passive components	19
2.5.1	Power converter	19
2.5.2	DC-link capacitor	19
2.5.3	Grid filter design	20
2.6	Controller board	21
2.7	Interface boards	22
2.7.1	Interfacing to gate driver	22
2.7.2	Gate driver circuit	23
2.7.3	Voltage and current measurement	25
2.8	Conclusion	27
Chapter 3	Three-Level Neutral Point Clamped Voltage Source Converter and Carrier Based Pulsewidth Modulation Technique	
3.1	Introduction	28
3.2	Three-level neutral point clamped voltage source inverter	29
3.2.1	Three-level neutral point clamped voltage source inverter configuration	29
3.2.2	Switching states	30
3.3	Carrier-based pulsewidth modulation technique	32
3.3.1	Principle of the proposed CB-PWM strategy	32
3.3.2	Output voltages synthesis	35
3.3.3	Calculation of duty cycles	37
3.4	Simulation results	41
3.5	Experimental results of CB-PWM strategy	45
3.6	Experimental results of grid-side three-level NPC VSC	53
3.6.1	Bidirectional power flow with unity power factor operation	53
3.6.2	Reactive power flow with lagging and leading power factor operation	55
3.7	Conclusion	56

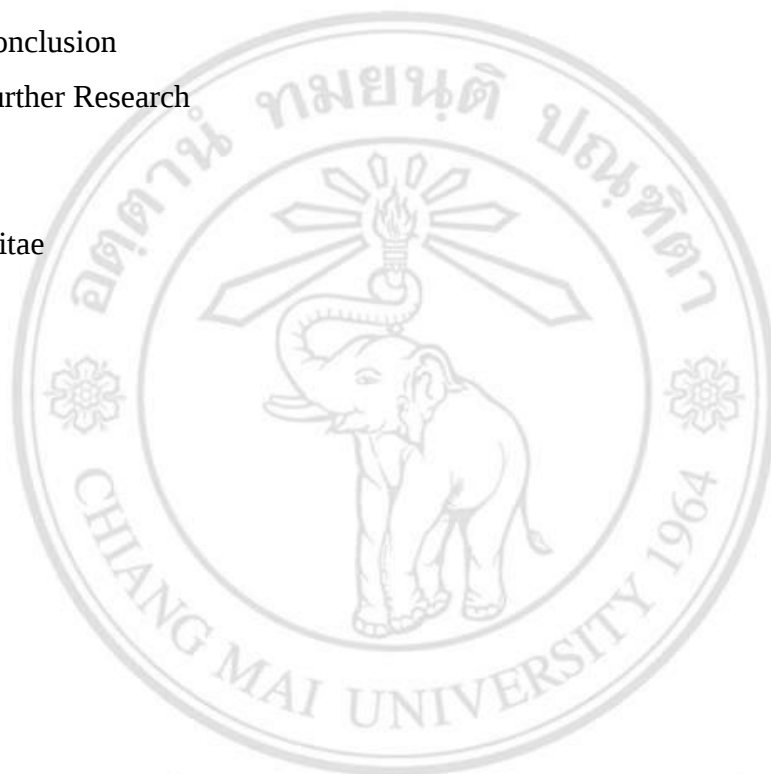
Chapter 4 Stator Flux Vector Control of Doubly-Fed Induction Generator using
Back-to-Back Two-Level Voltage Source Converter

4.1	Introduction	57
4.2	Doubly-fed induction generator system and mathematical model	57
4.2.1	Dynamic modeling of the doubly-fed induction generator	58
4.2.2	Power flow and operation modes of DFIG	61
4.3	Rotor-side converter controlled using stator flux vector control	63
4.3.1	Stator flux vector control principle	63
4.3.2	Stator flux vector position	65
4.3.3	Stator flux vector control scheme	66
4.4	Simulation results	68
4.4.1	Dynamic response in sub-synchronous speed	68
4.4.2	Dynamic response in super-synchronous speed	70
4.4.3	Dynamic response in speed change	72
4.5	Conclusion	77

Chapter 5 Stator Voltage Vector Control of Doubly-Fed Induction Generator using
Back-to-Back Three-Level Neutral Point Clamped Voltage Source
Converter

5.1	Introduction	78
5.2	DFIG system with back-to-back three-level NPC VSC	78
5.3	Rotor-side converter controlled of DFIG system	79
5.3.1	Stator voltage vector control principle	79
5.3.2	Stator voltage vector control scheme	82
5.3.3	Design of rotor current controller	84
5.4	Grid-side converter controlled of DFIG system	85
5.4.1	Grid-connected voltage vector control principle	85
5.4.2	Grid-connected voltage vector control scheme	88
5.4.3	Design of dc-link voltage controller	90
5.4.4	Design of grid-connected current controller	92
5.4.5	Phase-locked loop	94

5.5	Simulation results	95
5.4.1	Dynamic response in sub-synchronous speed	95
5.4.2	Dynamic response in super-synchronous speed	97
5.4.3	Dynamic response in speed change	99
5.6	Conclusions	104
Chapter 6	Conclusion and Further Research	
6.1	Conclusion	105
6.2	Further Research	106
	References	107
	Curriculum Vitae	115



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LIST OF TABLES

	Page
Table 2.1 Doubly-fed induction generator specification	18
Table 3.1 Switching states and pole voltages of a three-level neutral point clamped voltage source inverter	31
Table 3.2 The output voltage and THD for line-to-line voltages between simulation and experimental results under various modulation index	52

LIST OF FIGURES

	Page
Figure 1.1 Classification of generator system configurations	3
Figure 1.2 Variable speed generator system with reduced-capacity converter configurations	4
Figure 1.3 Variable speed generator system with full-capacity converter configurations	5
Figure 1.4 Classification of the DFIG control methods	6
Figure 2.1 The overall structure of the experimental setup	16
Figure 2.2 Experimental setup with prime mover and DFIG	17
Figure 2.3 The back-to-back three-level NPC VSC	19
Figure 2.4 The grid filters	20
Figure 2.5 The DS1103 PPC controller board	21
Figure 2.6 Block diagram of the DS1103 PPC controller board	22
Figure 2.7 The interfacing to gate driver circuit	23
Figure 2.8 Gate driver circuit for three-level NPC VSC	25
Figure 2.9 The schematic diagram of voltage and current measurement systems	26
Figure 3.1 Classification of multilevel voltage source converter configurations	28
Figure 3.2 Simplified schematic of the power circuit of the three-level NPC VSI	30
Figure 3.3 Space vector voltages diagram of the three-level NPC VSI	32
Figure 3.4 Proposed modified CB-PWM scheme for three-level NPC VSI	38
Figure 3.5 The modified duty cycles for leg A of the proposed CB-PWM strategy	39
Figure 3.6 The modified duty cycles for leg A of the proposed CB-PWM strategies	40
Figure 3.7 Simulation waveforms for leg A	41
Figure 3.8 Simulation waveforms of dynamic response operation for a ramp modulation index reference	42
Figure 3.9 Simulation waveforms at high modulation index	43
Figure 3.10 Simulation waveforms at low modulation index	43

Figure 3.11	Simulation harmonic spectrum of line-to-line voltage with proposed CB-PWM strategy	44
Figure 3.12	Experimental set-up	46
Figure 3.13	Experiment waveforms for leg A	47
Figure 3.14	Experimental waveforms of dynamic response operation for a ramp modulation index reference	48
Figure 3.15	Experiment waveforms of the proposed modified CB-PWM	49
Figure 3.16	Experiment waveforms of the conventional CB-PWM 2	50
Figure 3.17	Experimental harmonic spectrum of line-to-line voltage with the proposed CB-PWM strategy	51
Figure 3.18	THD of the output line-to-line voltages with modulation index of the three-level NPC VSI for different CB-PWM strategies	53
Figure 3.19	Experiment waveforms of the grid-side converter in the inverting mode at unity power factor operation	54
Figure 3.20	Experiment waveforms of the grid-side converter in the rectifying mode at unity power factor operation	54
Figure 3.21	Experiment waveforms of dynamic response operation in the inverting mode	55
Figure 3.22	Experiment waveforms of dynamic response operation in the rectifying mode	56
Figure 4.1	Configuration for the DFIG system using back-to-back converter	58
Figure 4.2	Equivalent circuit of the DFIG in rotating reference frame	59
Figure 4.3	Power flow diagram of a DFIG	61
Figure 4.4	Vector diagram between the stationary reference frame and stator flux vector reference frame	64
Figure 4.5	Block diagram of rotor-side two-level VSC of DFIG system with the stator flux vector control	67
Figure 4.6	Simulation results under constant stator active power and various stator reactive power steps in constant sub-synchronous speed	69
Figure 4.7	Simulation results under constant stator active power and various stator reactive power steps in constant super-synchronous speed	71

Figure 4.8	Simulation results under varying the stator active power during rotor speed variation	73
Figure 4.9	Simulation results under constant the stator active power during rotor speed variation.	74
Figure 4.10	Simulation results of active power under speed change with stator active power variation.	76
Figure 4.11	Simulation results of active power under speed change with stator active power constant.	76
Figure 5.1	Configuration for the DFIG system using back-to-back three-level NPC VSC	79
Figure 5.2	Vector diagram between the stationary reference frame and stator voltage vector reference frame	80
Figure 5.3	Block diagram of rotor-side three-level NPC VSC controlled for DFIG system	83
Figure 5.4	Block diagram of the rotor current control loop	84
Figure 5.5	Equivalent circuit of the grid-connected three-level NPC VSC	86
Figure 5.6	Phasor diagram of the grid-connected three-level NPC VSC	87
Figure 5.7	Block diagram of grid-side three-level NPC VSC controlled for DFIG system	89
Figure 5.8	Block diagram of the dc-link voltage control loop	91
Figure 5.9	Block diagram of the grid-connected current control loop	93
Figure 5.10	Block diagram of a utility grid phase-locked loop	94
Figure 5.11	Experiment waveforms of utility grid angle for PLL scheme	95
Figure 5.12	Simulation results under constant stator active power and various stator reactive power steps in constant sub-synchronous speed	96
Figure 5.13	Simulation results under constant stator active power and various stator reactive power steps in constant super-synchronous speed	98
Figure 5.14	Simulation results under varying the stator active power during rotor speed variation.	100
Figure 5.15	Simulation results under constant the stator active power during rotor speed variation.	101

- Figure 5.16 Simulation results of active power under speed change with
stator active power variation. 103
- Figure 5.17 Simulation results of active power under speed change with
stator active power constant. 103



LIST OF ABBREVIATIONS

CB-PWM	Carrier-Based Pulsewidth Modulation
DFIG	Double-Fed Induction Generator
DPC	Direct Power Control
DSP	Digital Signal Processing
DTC	Direct Torque Control
EGAT	Electricity Generating Authority of Thailand
EMC	Electromagnetic Compatibility
FOC	Field-Oriented Control
GUI	Graphical User Interface
IGBT	Insulated-Gate Bipolar Transistor
MRAS	Model Reference Adaptive System
NPC	Neutral Point Clamped
PI	Proportional-Integral Controller
PMSG	Permanent Magnet Synchronous Generator
PMSM	Permanent Magnet Synchronous Motor
PWM	Pulsewidth Modulation
SCIG	Squirrel Cage Induction Generator
SPWM	Sinusoidal Pulsewidth Modulation
SVM	Space Vector Modulation
THD	Total Harmonic Distortion
VSC	Voltage Source Converter
VSI	Voltage Source Inverter
WRIM	Wound Rotor Induction Generator
WRSG	Wound Rotor Synchronous Generator

LIST OF SYMBOLS

PE	potential energy
g	acceleration of gravity
H_A	available head
H_E	effective head
P_A	available power of the hydro
η_g	efficiency of the generator
η_t	efficiency of turbine
η	efficiency of the generator
η_{hydro}	hydraulic turbine efficiency
ρ	density of the water
Q	flow rate of the water
P_{hydro}	electric power of the hydraulic power
$P_{m,hydro}$	mechanical hydraulic power
m_a	modulation index
v_A^*, v_B^*, v_C^*	three-phase sinusoidal reference voltages
v_0^*	zero-sequence voltage
$v_{A,0}^*, v_{B,0}^*, v_{C,0}^*$	non-sinusoidal three-phase reference voltages
$v_{A,M}^*, v_{B,M}^*, v_{C,M}^*$	modified reference voltages
$v_{AP}^*, v_{BP}^*, v_{CP}^*$	positive reference voltages
$v_{AN}^*, v_{BN}^*, v_{CN}^*$	negative reference voltages
v_{AZ}, v_{BZ}, v_{CZ}	pole voltages
v_{AB}, v_{BC}, v_{CA}	line-to-line voltages
v_{An}, v_{Bn}, v_{Cn}	phase-to-neutral voltages
V_d, V_{dc}	dc-link voltage

$\omega_s t$	inverter electrical position
f_1	fundamental frequency
d_A, d_B, d_C	duty cycles
d_{AP}, d_{BP}, d_{CP}	positive duty cycles
d_{AN}, d_{BN}, d_{CN}	negative duty cycles
s, r	stator and rotor indices
d, q	direct and quadrature indices for orthogonal components
d / dt	differential operation
$v_{sd}, v_{sq}, v_{rd}, v_{rq}$	direct and quadrature stator and rotor voltages
$i_{sd}, i_{sq}, i_{rd}, i_{rq}$	direct and quadrature stator and rotor currents
$\lambda_{sd}, \lambda_{sq}, \lambda_{rd}, \lambda_{rq}$	direct and quadrature stator and rotor flux linkages
R_s, R_r	stator and rotor phase resistances
ω_s	synchronous angular speed
ω_r	rotor angular speed
ω_{sl}	slip angular speed
L_s	stator phase inductance
L_r	rotor phase inductance
L_m	magnetizing phase inductance
T_e	electromagnetic torque
p_p	number of pole pairs
P_s, Q_s	stator active and reactive powers
P_r, Q_r	rotor active and reactive powers
P_g	grid-side active power
P_t	total active power
s	slip
θ_s	stator flux vector position

ข้อความแห่งการริเริ่ม

วิทยานิพนธ์นี้ได้นำเสนอหลักการควบคุมเครื่องกำเนิดไฟฟ้าเหนี่ยวนำแบบป้อนสองทางโดยใช้คอนเวอร์เตอร์สามระดับชนิดตึ่งจุดนิวตริลแบบหันหลังชนกันสำหรับประยุกต์ใช้ในเครื่องกังหันน้ำขนาดเล็ก นอกจากนี้ยังได้นำเสนอการดัดแปลงวิธีการสร้างสัญญาณมอดูเลตแบบไม่ต่อเนื่องรูปแบบใหม่สำหรับคอนเวอร์เตอร์สามระดับชนิดตึ่งจุดนิวตริล



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STATEMENT OF ORIGINALITY

A control strategy of the doubly-fed induction generator system using the back-to-back three-level neutral point clamped voltage source converter for small hydro turbine application has been proposed. A modified unipolar carrier-based pulsewidth modulation algorithm for the three-level neutral point clamped voltage source converter has been proposed.



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