Short circuit current calculation for full converter based wind power plants

By

Abdelazeem Hassan Shehata Atyia

A Thesis Submitted to the
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in Partial Fulfillment of the
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Title of Thesis:

Short circuit current calculation for full converter based wind power plants

Key Words:
Full converter based wind turbines; Short circuit current calculation; Fault ride through; Generic model

Summary:

This thesis presents a new method for calculating steady state short circuit current of full converter based wind generator using generic model, taken into consideration Low Voltage Ride Through requirements and voltage support according to the grid codes. To evaluate the performance of the method, two case studies have been performed. The method has been implemented in Matlab, and the results are compared with that deduced from dynamic simulation using Power World Simulator program that contains the generic model of the full converter based wind power plants the difference in the results is within 1%, which confirms the accuracy of the proposed method.

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Dedication

I dedicate this thesis to my dad, brothers, and friends .

Table of contents

ACKNOWLEDGEMENTS i

DEDICATION ii

TABLE OF CONTENTS iii

LIST OF FIGURES vii

LIST OF TABLES ix

NOMENCLATURE xi

ABSTRACT xiii

Chapter 1: Introduction 1
- 1.1 Background . . . 1
- 1.2 Motivation . . . 1
- 1.3 Problem statement . . . 1
- 1.4 Thesis objective . . . 2
- 1.5 Power system simulation tool . . . 2
- 1.6 Thesis organization . . . 3

Chapter 2: Overview of the LVRT requirements of national grid codes for wind turbines 4
- 2.1 Introduction . . . 4
- 2.2 Wind turbine types . . . 4
  - 2.2.1 Fixed-speed wind turbines (Type 1) . . . 4
  - 2.2.2 Semi variable speed WTs (Type 2) . . . 5
  - 2.2.3 Doubly fed induction generator (DFIG) (Type 3) . . . 5
  - 2.2.4 Full converter cased wind turbine (Type 4) . . . 6
- 2.3 Gride code requirements . . . 7
- 2.4 Importance of fault ride through capability . . . 8
- 2.5 LVRT Requirements in National Grid Codes . . . 9
  - 2.5.1 Denmark . . . 10
  - 2.5.2 Germany . . . 10
  - 2.5.3 Spain . . . 12
  - 2.5.4 Egyptian grid code requirements . . . 13
  - 2.5.5 Italy . . . 15

2.5.6 USA . . . 16
2.5.7 Canada . . . 16
2.6 AWEA(American Wind Energy Association) . . . 18
2.7 Reactive current injection for voltage support . . . 19
2.8 Comparison between FRT requirements in national grid codes . . . 19
2.9 Summary . . . 20

Chapter 3: Short-circuit calculation 21
3.1 Introduction . . . 21
3.2 Types of faults . . . 21
3.3 Short circuit transient on a transmission line . . . 22
3.4 Fault on synchronous machine terminal . . . 23
3.5 Generator model for fault studies . . . 24
3.6 Difference between short circuit behavior of synchronous generator and voltage source converter wind turbine generator . . . 24
3.7 Short-circuit analysis methods . . . 25
3.8 The classification of SC calculation methods according to applications . . . 25
3.8.1 Planning conditions . . . 25
3.8.2 Operating conditions . . . 26
3.9 Standards for short-circuit calculations . . . 26
3.10 Standard methods for short circuit calculation . . . 26
3.11 Short-circuit calculation using Power World Simulator . . . 27
3.12 Summary . . . 28

Chapter 4: Generic model for type 4 wind turbine generators 29
4.1 Introduction . . . 29
4.2 Need for generic model for type 4 wind turbine generators . . . 29
4.3 Generic models industry groups . . . 30
4.4 Importance of generic model . . . 30
4.5 Generic model properties . . . 30
4.6 Wind Generation . . . 30
4.6.1 Wind power plant topology . . . 30
4.6.2 Single machine equivalent representation (aggregation of multiple WTs) . . . 31
4.7 Generic models for WTs . . . 32
4.8 Generic model parameters . . . 36
4.8.1 Model validation test . . . 36
4.8.2 EPRI model validation programs . . . 37
4.8.3 Parameters of WT type 4 WECC generic model . . . 37
4.9 Summary . . . 38

Chapter 5: Integrating wind power plants with nuclear facilities 39
5.1 Introduction . . . 39
5.2 Connecting a Nuclear Power Plant to the Grid . . . 39
5.3 Connection of WPPs and NPP to the electrical grid . . . 40
5.4 Generic Model Data for NPP Generator . . . 40
5.5 Connection of WPPs with the Egypt research reactors . . . 43
5.6 Summary . . . 43

Chapter 6: Developed method for steady state fault current calculation 44
6.1 Introduction . . . 44
6.2 Needing a new method to compute fault current of VSC WTs . . . 44
6.3 Pre-fault operation of WTs . . . 44
6.4 After fault . . . 45
6.5 Developed method for short-circuit calculations . . . 45
6.5.1 Pre fault load flow calculations . . . 45
6.5.2 Fault study of type 4 WTG, detailed model . . . 47
6.5.3 Developed steps for short circuit calculations . . . 48
6.6 Summary . . . 54

Chapter 7: Results and Discussion 56
7.1 Case I: WECC 6 - Bus system . . . 56
7.2 Dynamic simulation results . . . 57
7.2.1 Injected reactive current from WPP . . . 57
7.2.2 WT terminal voltage . . . 59
7.2.3 Voltage at the bus 3 . . . 61
7.2.4 Reactive current contribution by type 4 WTs . . . 63
7.2.5 Active and reactive fault current contribution by type 4 WTs . . . 65
7.2.6 Active and reactive WTs converter limits . . . 67
7.3 Application of developed method and comparison with PWS . . . 68
7.3.1 Fault at bus 3 with $Z_f = j\,0.2$ pu , $k = 0$ . . . 68
7.3.2 Fault at bus 3 with $Z_f = j\,0.2$ pu , $k = 2$ . . . 70
7.3.3 Fault at bus 3 with $Z_f = j\,0.2$ pu , $k = 4$ . . . 71
7.3.4 Fault at bus 3 with $Z_f = j\,0.2$ pu , $k = 6$ . . . 72
7.3.5 Fault at bus 3 with $Z_f = j\,0.2$ pu , $k = 8$ . . . 72
7.3.6 Fault at bus 3 with $Z_f = j\,0.2$ pu , $k = 10$ . . . 73
7.3.7 Fault currents with different values of k . . . 74
7.4 Case II: Modified WSCC 9 - Bus system with added aggregated model . . . 75
7.4.1 Background description . . . 75
7.4.2 Fault at bus 5 with $Z_f = j\,0.1$ pu, and $k = 0$ . . . 76
7.4.3 Fault at bus 5 with $Z_f = j\,0.1$ pu, and $k = 2$ . . . 77
7.4.4 Fault at bus 5 with $Z_f = j\,0.1$ pu, and $k = 4$ . . . 77
7.4.5 Fault at bus 5 with $Z_f = j\,0.1$ pu, and $k = 6$ . . . 78
7.4.6 Fault at bus 5 with $Z_f = j\,0.1$ pu, and $k = 8$ . . . 78
7.4.7 Fault at bus 5 with $Z_f = j\,0.1$ pu, and $k = 10$ . . . 79
7.4.8 Fault at bus 8 with $Z_f = j\,0.1$ pu, and $k = 0$ . . . 80
7.4.9 Fault at bus 8 with $Z_f = j\,0.1$ pu, and $k = 2$ . . . 80
7.4.10 Fault at bus 8 with $X_f = j\,0.1$ pu, and $k = 4$ . . . 81
7.4.11 Fault at bus 8 with $Z_f = j\,0.1$ pu, and $k = 6$ . . . 81
7.4.12 System generator fault currents with different values of k at $Z_f = j\,0.1$ and fault at bus 8 . . . 81
7.4.13 Fault at bus 6 with $K = 2$, with different values of Z_f . . . 84
7.5 Distribution of fault current from system generators at different fault locations . . . 85
7.6 Summary . . . 86

Chapter 8: Conclusion and Future Work 87
8.1 Conclusion . . . 87

8.2 Future Work 88

Appendix A: WECC 6-Bus system data 93

Appendix B: IEEE 9-Bus system data 94

Appendix C: Results of load flow of the WECC 6-Bus system 95

List of Figures

Figure 2.1 Typical Configuration of a Type 1 WTG 5
Figure 2.2 Typical Configuration of a Type 2 WTG 5
Figure 2.3 Typical Configuration of a Type 3 WTG 6
Figure 2.4 Typical Configuration of a Type 4 WTG 7
Figure 2.5 Voltage dips during a three-phase short circuit [11] 9
Figure 2.6 Voltage profile for simulation of symmetric three-phase faults [12] . 10
Figure 2.7 Voltage limit values for disconnection of type 2 GUs during grid fault 11
Figure 2.8 Voltage support requirement from E.On in the event of grid faults . 12
Figure 2.9 Low voltage ride through capability for wind turbines in the Spanish transmission grid code 13
Figure 2.10 Reactive current injection requirements according to the Spanish grid codes. 13
Figure 2.11 Fault ride through profile for a Wind Farm 14
Figure 2.12 Temporary voltage drops due to a non-successful auto-reclosure . . 14
Figure 2.13 Current injection during the fault 15
Figure 2.14 Voltage profile for fault ride-through capability in italy 16
Figure 2.15 Minimum response of the wind power plant required to extra low voltage in USA. 16
Figure 2.16 FRT capability from Hydro-Quebec for wind turbine generators during three phase short circuit. 17
Figure 2.17 Fault ride through requirements from AESO-Alberta 18
Figure 2.18 AWEA Low Voltage Ride Through capability until end 2006 18
Figure 2.19 Review of fault ride through requirements for wind power in European grid codes 20

Figure 3.1 Different types of short circuits. 22
Figure 3.2 Transmission line representation model. 22
Figure 3.3 Waveform of a fault current on a transmission line 23
Figure 3.4 Symmetrical fault armature current of synchronous machine 24
Figure 3.5 Linear generator model for short circuit studies 24
Figure 3.6 Different options of fault calculation using Power Word Simulator program 27
Figure 3.7 Options of fault current calculation 28

Figure 4.1 Wind power plant topology 31
Figure 4.2 Single-machine equivalent power flow representation 32
Figure 4.3 The VSC generator wind turbine model 32
Figure 4.4 Renewable energy generator/converter model A (*regc_a*) 33
Figure 4.5 Options for the reactive power control path in the *reec_a* model [41] 35
Figure 4.6 Plant active power controller model 36

Figure 4.7 Wind power plant reactive power controller model 36
Figure 4.8 Type 4 data entry parameter menu 37

Figure 5.1 Electrical connections of the NPP to two substations [44] 40

Figure 6.1 Representation of wind farms for steady-state power flow analysis . 45
Figure 6.2 Power system representation 46
Figure 6.3 Power system representation with a fault at bus f 48
Figure 6.4 Injected reactive current for grid voltage support according to the German code. 52
Figure 6.5 Overall generic model structure for type 4 WTG [40]. 53
Figure 6.6 The alternative generator/converter model [40] 54
Figure 6.7 Flow chart of developed method 55

Figure 7.1 WECC 6 - BUS as a test case system [59] 57
Figure 7.2 Injected reactive current for k=0 58
Figure 7.3 Injected reactive current for k=2 59
Figure 7.4 Voltage at the WT for k=0 60
Figure 7.5 Voltage at the WT for $k = 2$ 61
Figure 7.6 Voltage at Bus 3 for k=0 62
Figure 7.7 Voltage at Bus 3 for k=2 63
Figure 7.8 VSCs WTs reactive current contribution for k=0 64
Figure 7.9 VSCs WTs reactive current contribution for k=2 65
Figure 7.10 Active and Reactive current of WT for k=0 66
Figure 7.11 Active and Reactive current of WT for k=2 67
Figure 7.12 Fault current contribution of WT for $k = 8$ 68
Figure 7.13 Percentage errors of SSPWS and developed method compared with dynamic PWS results for 6-Bus system 69
Figure 7.14 Fault currents of wind turbine and synchronous generator at different values of k and $Z_f = j\,0.2\,pu$ 75
Figure 7.15 The modified WSCC 9-bus system with added aggregated model . . 76
Figure 7.16 Fault currents of wind turbine, synchronous generator at bus one and Nuclear power plant at different values of k and $Z_f = j\,0.1\,pu$ at bus 5 80
Figure 7.17 Percentage errors of steady state PWS and developed method compared with dynamic PWS results for 9 - Bus system 82
Figure 7.18 The comparison between the error of the developed method and the steady state PWS method for I_{SG1} 83
Figure 7.19 The comparison between the error of the developed method and the steady state PWS method for I_{NPP} 84
Figure 7.20 I_{sorc}, I_{SG1}, and I_{NPP} at bus one and Nuclear power plant at different buses for $Z_f = j\,0.1\,pu$, $k = 2$ 86

List of Tables

Table 2.1 Summary of fault ride through requirements for wind turbines in various national grid codes. 19

Table 4.1 Reactive power control options 34

Table 5.1 Parameters of the IEEE Type1 Excitation system of the NPP 41
Table 5.2 Parameters of the TGOV1 steam turbine governor of the NPP . . . 41
Table 5.3 Parameters of the GENROU Round Rotor Generator of the NPP . . 42

Table 7.1 Dynamic power world simulator and developed method results . . . 69
Table 7.2 Developed method and steady state power world simulator results . 69
Table 7.3 Current of wind turbine and SG at $k = 0$ and $Z_f = j\,0.2\,pu$ 70
Table 7.4 Current of wind turbine and SG at $k = 0$ and $Z_f = j\,0.2\,pu$, calculated from SSPWS and Developed method 70
Table 7.5 Voltage magnitude and angle at each bus at $k = 2$ and $Z_f = j\,0.2\,pu$ 70
Table 7.6 Current of wind turbine and SG at $k = 2$ and $Z_f = j\,0.2\,pu$ 71
Table 7.7 Voltage magnitude and angle at each bus at $k = 4$ and $Z_f = j\,0.2\,pu$ 71
Table 7.8 Current of wind turbine and SG at $k = 4$ and $Z_f = j\,0.2\,pu$ 71
Table 7.9 Voltage magnitude and angle at each bus at $k = 6$ and $Z_f = j\,0.2\,pu$ 72
Table 7.10 Current of wind turbine and SG at $k = 6$ and $Z_f = j\,0.2\,pu$ 72
Table 7.11 Voltage magnitude and angle at each bus at $k = 8$ and $Z_f = j\,0.2\,pu$ 73
Table 7.12 Current of wind turbine and SG at $k = 8$ and $Z_f = j\,0.2\,pu$ 73
Table 7.13 Voltage magnitude and angle at each bus at $k = 10$ and $Z_f = j\,0.2\,pu$ 73
Table 7.14 current of wind turbine and SG at $k = 10$ and $Z_f = j\,0.2\,pu$ 74
Table 7.15 Fault currents of wind turbine and synchronous generator at different values of k and $Z_f = j\,0.2\,pu$ 74
Table 7.16 Voltage magnitude and angle at buses at $k = 0$ and $Z_f = j\,0.1\,pu$ and fault at bus 5 76
Table 7.17 Current of wind turbine and SGs at $k = 0$ and $Z_f = j\,0.1\,pu$ 76
Table 7.18 Voltage magnitude and angle at buses at $k = 2$ and $Z_f = j\,0.1\,pu$, and fault at bus 5 77
Table 7.19 Current of wind turbine and SGs at $k = 2$ and $Z_f = j\,0.1\,pu$, and fault at bus 5 77
Table 7.20 Voltage magnitude, and angle at buses at $k = 4$, and $Z_f = j\,0.1\,pu$ and fault at bus 5 78
Table 7.21 Current of wind turbine and SGs at $k = 4$, and $Z_f = j\,0.1\,pu$ 78
Table 7.22 Current of wind turbine and SGs at $k = 6$ and $Z_f = j\,0.1\,pu$ 78
Table 7.23 Current of wind turbine and SGs at $k = 8$, and $Z_f = j\,0.1\,pu$ 79
Table 7.24 Current of wind turbine, and SGs at $k = 10$ and $Z_f = j\,0.1\,pu$ 79
Table 7.25 Fault currents of wind turbine ,synchronous generator at bus one and Nuclear power plant at different values of k, and $Z_f = j\,0.1\,pu$ 79

Table 7.26 Current of wind turbine and SGs at $k = 0$ and $Z_f = j\,0.1\,pu$, and fault at bus 8 80
Table 7.27 Iq_{inj}, I_{sorcc}, I_{SG1}, and I_{NPP} at $k = 2$ and $Z_f = j\,0.1\,pu$, and fault at bus 8 81
Table 7.28 Current of wind turbine and SGs at $k = 4$ and $Z_f = j\,0.1\,pu$, and fault at bus 8 81
Table 7.29 Current of wind turbine and SGs at $k = 6$ and $Z_f = j\,0.1\,pu$ 81
Table 7.30 Wind Turbine fault currents at different values of k and $Z_f = j\,0.1\,pu$ 82
Table 7.31 Synchronous generator current at bus 1 at different values of k and $Z_f = j\,0.1\,pu$ 83
Table 7.32 Nuclear Power Plant at bus 3 fault current at different values of k and $Z_f = j\,0.1\,pu$ 84
Table 7.33 Injected reactive current by WPP at different values of Z_f and $K = 2$ 85
Table 7.34 Synchronous generator current at bus 1 fault current at different values of Z_f and $K = 2$ 85
Table 7.35 I_{NPP} at different values of Z_f and $K = 2$ 85
Table 7.36 Fault current contribution by WPP at different values of Z_f and $K = 2$ 85
Table 7.37 I_{sorc}, I_{SG1}, and I_{NPP} at $k = 2$ and $Z_f = j\,0.1\,pu$ at different bus locations 85

Table A.1 Line data for 6 Bus system 93
Table A.2 Bus data for 6 Bus system ($S_{base} = 100MVA$) 93

Table B.1 Line data for for 9 Bus System with WPP aggregated model 94
Table B.2 Bus data for 9 Bus System with WPP aggregated model ($S_{base} = 100MVA$) 94

Table C.1 Pre-fault Voltage magnitude and angle at each bus 95
Table C.2 Pre-fault wind turbine currents 95

Nomenclature

ANSI American National Standards Institute

DFIG Doubly Fed Induction Generator

DVS Dynamic Voltage Sustain

E.ON European holding company,Germany

ETRR1 The first nuclear reactor in Egypt

ETRR2 The second nuclear reactor in Egypt

FCB Full Converter Based

FRC Full Rated Converter

FRT Fault Ride Through

GU Generating Unit

IB Required reactive current change during fault

IBDG Inverter Based Distributed Generation

IEC International Electrotechnical Commission

LVRT Low Voltage Ride Through

NPP Nuclear Power Plant

PCC Point of Common Coupling

PMSG Permanent Magnet Synchronous Generator

POC Point of Connection

POI Point of interconnection

pu per unit

REMV Renewable Energy Model Validation

SAVNW Case comprises a simple power system network. It shows how to build a case in PSS/E and the kind of data input required to study power flow, fault analysis and dynamic behavior of power system network.