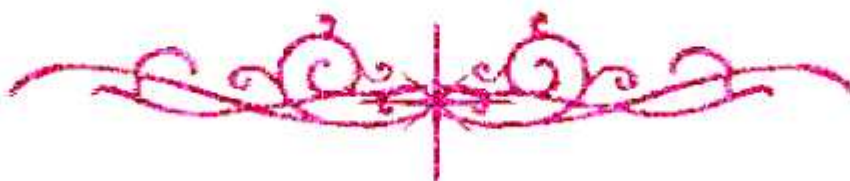


بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



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Cairo University

ADVANCED CONTROL OF THE EGYPTIAN UNIFIED ELECTRICAL GRID WITH THE IMPACT OF THE NUCLEAR POWER GENERATION IN DABAA

By

Khaled Mohamed Rady El-Tohamy

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY
in
Electrical Power and Machines Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2021

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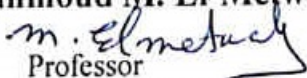
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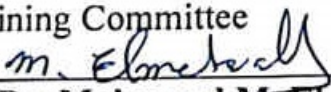
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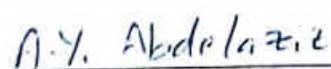

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Key Words:

Dabaa Nuclear power plant, pressurized water reactor, Nonlinear controller, Fractional calculus, electrical power system

Summary:

This thesis presents a full-scale model of a Dabaa nuclear power plant. An equivalent national electrical grid is modelled to study the interaction effects between the nuclear power plant and the national electrical grid. A novel nonlinear controller was proposed for robust control of the Dabaa Nuclear power plant and unlocking the potential for load following operation. The load following operation for the Dabaa nuclear power plant was tested on the Egyptian unified electrical grid to ensure that it will not violate any of the manufactures safety related concerns.

احمد باهات
محمد شراج

Disclaimer

I hereby declare that this thesis is my original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

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Dedication

To my Mom, Dad and my wonderful daughters Jolie and Nariman

Table of Contents

DISCLAIMER.....	II
ACKNOWLEDGMENTS.....	II
DEDICATION.....	III
TABLE OF CONTENTS	IV
LIST OF TABLES.....	VII
LIST OF FIGURES.....	VII
LIST OF ABBREVIATIONS	XI
LIST OF SYMBOLS	XIII
ABSTRACT.....	XIV
CHAPTER 1 : INTRODUCTION.....	1
1.1. NUCLEAR POWER PLANT	2
1.1.1. Definition	2
1.1.2. Nuclear Fission.....	2
1.2. TYPES OF NUCLEAR POWER PLANT	3
1.2.1.1. The pressurized water reactor (PWR)	3
1.2.1.2. Boiling Water Reactor (BWR).....	5
1.2.1.3. Heavy Water Reactor (HWR)	7
1.2.1.4. Gas Cooled Reactors (GCR)	9
1.2.2. Dabaa typical commercial version of PWR	9
1.3. ORGANIZATION OF THE THESIS.....	12
CHAPTER 2 : MODELLING THE EQUIVALENT NATIONAL ELECTRICAL GRID AND ANALYSIS THE LOAD FLOW AND DYNAMIC STABILITY	13
2.1. INTRODUCTION	13
2.2. OVERVIEW OF THE EGYPTIAN ELECTRICAL GRID	13
2.3. MATHEMATICAL MODEL OF LOAD FLOW	21
2.4. LOAD FLOW SOLUTION	22
2.5. LOAD FLOW SIMULATION RESULTS.....	22
2.6. POWER SYSTEM STABILITY	39
2.6.1. Discussion and Elaboration.....	39
2.6.2. Classification of Power System Stability	40
2.6.3. Stability classification	40
2.6.4. Rotor Angle Stability	41

2.6.5.	Voltage Stability.....	42
2.6.5.1.	Frequency Stability	44
2.7.	BASIC THEORY OF TRANSIENT STABILITY	44
2.8.	TRANSIENT STABILITY SIMULATION RESULTS	44
2.8.1.	Alexandria/ West Delta zone.....	45
2.8.1.	Canal zone	49
2.8.2.	Upper Egypt zone.....	53
2.8.3.	Cairo zone	57
2.8.4.	Delta zone.....	61

CHAPTER 3 : MATHEMATICAL MODEL FOR THE DABAA NUCLEAR POWER PLANT65

3.1.	INTRODUCTION	65
3.2.	CALIBRATED FRAMEWORK METHODOLOGY	65
3.3.	MATHEMATICAL MODEL AND MODELLING ASSUMPTIONS	67
3.3.1.	Modelling the primary coolant loop.....	67
3.3.1.1.	The Reactor Core	69
3.3.1.2.	The Tubes and Pipes of The Primary coolant loop.....	70
3.3.1.3.	The Pressurizer and its Controller.....	71
3.3.2.	Modelling the secondary coolant loop	74
3.3.1.	The Steam Generator.....	75
3.3.2.	The Steam Collector.....	76
3.3.3.	The Turbine.....	76
3.3.3.1.	Control Valve.....	76
3.3.4.	Dead space.....	77
3.3.5.	Stages	77
3.3.6.	Moisture Separator and Reheater	78
3.3.7.	The output mechanical power	79
3.3.8.	The synchronous generator	79
3.3.9.	The Winding sub-model.....	80
3.3.10.	The flux linkage equations	80
3.3.11.	The voltage equations.....	81
3.3.12.	The Torque Equations	82
3.3.13.	The electrical power output.....	82
3.3.14.	The Load equations	82
3.4.	APPLYING THE FRAMEWORK ON THE REACTOR.....	83
3.4.1.	Parameter estimation	87
3.4.2.	Measurements.....	88
3.4.3.	Structure Identifiability Analysis	88
3.4.4.	Parameter sensitivity	89
3.4.5.	Estimation Method	91
3.4.6.	Results and discussion.....	93

3.5. CONCLUSION.....	97
CHAPTER 4 : NUCLEAR POWER PLANT CONTROLLERS.....	98
4.1. INTRODUCTION	98
4.2. THE REACTOR CONTROL SYSTEM	98
4.3. MANAGEMENT OF CONTROL ROD	101
4.4. PRESSURIZER CONTROLLER.....	104
4.4.1. Water level control system for the pressurizer	105
4.4.2. Pressurizer pressure control system.....	106
4.5. WATER LEVEL CONTROL SYSTEM FOR THE STEAM GENERATOR	108
4.6. CONTROL SYSTEM FOR THE TURBINE	111
4.6.1. Digital Electro-Hydraulic Control System.....	111
CHAPTER 5 : ROBUST CONTROLLER FOR THE DABAA NUCLEAR POWER PLANT.....	115
5.1. INTRODUCTION	115
5.2. CONVENTIONAL ROD SPEED PROGRAM	117
5.3. THE GENERIC MODEL CONTROL.....	119
5.3.1. Formulation of the controller	120
5.3.2. Tuning of the controller.....	123
5.4. METHODOLOGY FOR BENCHMARKING	125
5.5. RESULTS AND DISCUSSION.....	126
5.6. CONCLUSION.....	128
CHAPTER 6 : DISCUSSION AND CONCLUSION	129
6.1. INTRODUCTION	129
6.2. SIMULTANEOUS SIMULATION APPROACH	129
6.3. PROPOSED AUTOMATIC GENERATION CONTROL (AGC)	131
6.4. IMPACT OF EGYPTIAN ELECTRICAL GRID OPERATION ON NUCLEAR POWER PLANTS (LONG TERM SIMULATION).....	133
6.5. MUTUAL IMPACT OF EGYPTIAN ELECTRICAL GRID DISTURBANCES WITH NUCLEAR POWER PLANTS (TRANSIENT SIMULATION).....	148
6.5.1. Fault on Bus 1577 (Dabaa G nuclear power plant).....	149
6.5.2. Fault on Bus 950 (S. KRIR).....	158
6.6. CONCLUSION AND RECOMMENDATIONS.....	166
LIST OF PUBLICATIONS	167
REFERENCES.....	168
APPENDIX A: SIMULINK DIAGRAMS.....	173
APPENDIX B: MATLAB CODES.....	181

List of Tables

Table 2.1: Installed capacity detailed explanation according to type and zone. (Courtesy of: EEHD, annual report 2018/2019.)	17
Table 2.2: Values of voltage under limit standard	23
Table 3.1: Values of the estimated parameters with the acceptable domain	94
Table 6.1: Trials for running simultaneous simulation	130
Table 6.2: maneuvering characteristics of the DABAA N.P.P with VVER-1200	134

List of Figures

Figure 1.1: The sequence of the fission. (Courtesy of: chemwiki.ucdavis.edu).....	2
Figure 1.2: : Schematic for the Pressurized water reactor core. (Courtesy of: IAEA, status report 108.).....	10
Figure 2.1: Development of transmission lines lengths (Courtesy of: IAEA, status report 108.)	15
Figure 2.2: Gross energy generated evolution in GWh (Courtesy of: EEHD, annual report 2018/2019.)	15
Figure 2.3: Daily variations of the electricity demand and the development of peak load. (Courtesy of: EEHD, annual report 2018/2019.)	16
Figure 2.4: Egyptian energy mix expansion plans and reserve margin until 2022. (Courtesy of: "Addressing Egypt's Electricity vision", EEDC.).....	19
Figure 2.5: Typical graph of the Unified Egyptian Electricity National Grid. (Courtesy of: www.moe.gov.eg, 2018.)	20
Figure 2.6: Bus's Voltage in Pu (ALEX zone)	24
Figure 2.7: Bus's Voltage Angles in Degree (ALEX zone)	25
Figure 2.8: Bus's Load MW, MVAR (ALEX zone)	26
Figure 2.9: Bus's Voltage in Pu (Canal zone)	27
Figure 2.10: Bus's Voltage Angles in Degree (Canal Zone)	28
Figure 2.11: Bus's Load MW, MVAR (CANAL Zone).....	29
Figure 2.12: Bus's Voltage in Pu (Upper Egypt zone)	30
Figure 2.13: Bus's Voltage Angles in Degree (UPPER Zone).....	31
Figure 2.14: Bus's Load MW, MVAR (Upper Egypt Zone).....	32
Figure 2.15: Bus's Voltage in Pu (Cairo zone).....	33
Figure 2.16: Bus's Voltage Angles in Degree (Cairo Zone)	34
Figure 2.17: Bus's Load MW, MVAR (Cairo Zone).....	35
Figure 2.18: Bus's Voltage in Pu (Delta zone)	36
Figure 2.19: Bus's Voltage Angles in Degree (Delta Zone).....	37
Figure 2.20: Bus's Load MW, MVAR (Delta Zone).....	38
Figure 2.21: Classification of power system stability.....	41
Figure 2.22: Change of frequencies of generators with fault at 3 to 3.2 sec on bus 404 Alex zone	46
Figure 2.23: Generators rotor angle with fault at 3 TO 3.2 sec on bus 404 Alex zone	47

Figure 2.24: Bus voltage with fault at 3 to 3.2 sec on bus 404 Alex zone.....	48
Figure 2.25: Change of frequencies of generators with fault at 3 to 3.2 sec on bus 204 Canal zone	50
Figure 2.26: Generators rotor angle with fault at 3 TO 3.2 sec on Bus 305 A. Mousa Canal zone	51
Figure 2.27: Bus voltage with fault at 3 to 3.2 sec on bus 204 Canal zone	52
Figure 2.28: Change of frequencies of generators with fault at 3 to 3.2 sec on bus 530 GN.KURIM Upper Egypt zone	54
Figure 2.29: Generators rotor angle with fault at 3 to 3.2 sec on bus 530 GN.KURIM Upper Egypt zone	55
Figure 2.30: Bus voltage with fault at 3 to 3.2 sec on Bus 530 GN.KURIM Upper Egypt zone	56
Figure 2.31: Change of frequencies of generators with fault at 3 to 3.2 sec on bus 426 GN1SH.KH Cairo zone	58
Figure 2.32: Generators rotor angle with fault at 3 to 3.2 sec on bus 426 GN1SH.KH Cairo zone	59
Figure 2.33: Bus Voltage with fault at 3 to 3.2 sec on bus 426 Cairo Zone.....	60
Figure 2.34: Generators Rotor Angle with fault at 3 TO 3.2 sec on Bus 537GN TALKHA Delta Zone.....	62
Figure 2.35: Change of Frequencies of Generators with fault at 3 to 3.2 sec on Bus 537 GN.TALH Delta Zone	63
Figure 2.36: Bus Voltage with fault at 3 to 3.2 sec on Bus 537 Delta Zone	64
Figure 3.1: The proposed model framework.....	66
Figure 3.2: Primary coolant loop model for the VVER-type nuclear power plant(Courtesy of: Hungarian Academy of Sciences, Hungry.)	68
Figure 3.3: Primary coolant thermodynamics between the reactor and the steam generator ..	71
Figure 3.4: Secondary coolant loop model for the VVER. (Courtesy of: Hungarian Academy of Sciences, Hungry.).....	74
Figure 3.5: Matlab® Simulink model for Eq 1	85
Figure 3.6: Matlab® Simulink model for Eqs 3 and 4	86
Figure 3.7: Matlab® Simulink model for Eq 7.....	87
Figure 3.8: Tornado plot showing the error in the Neutron density normalized value.....	90
Figure 3.9: Tornado plot showing the error in the reactor moderator temperatures.....	90
Figure 3.10: Inlet control rod position signal.....	92
Figure 3.11: Inlet temperature signal	92
Figure 3.12: Outlet measured neutron flux normalized signal	93
Figure 3.13: Outlet measured average temperature signal.....	93
Figure 3.14: The measured and the simulated neutron flux using CNPK and FNPK	95
Figure 3.15: The measured and the simulated temperature of the moderator using CNPK and FNPK using CNPK and FNPK	96
Figure 4.1: overall configuration of the system. (Courtesy of: Nuclear Reactor Kinetics and Plant Control, Oka, Y. and Suzuki, K., 2013.)	99
Figure 4.2: Block diagram representation of the reactor control system. (Courtesy of: Nuclear Reactor Kinetics and Plant Control, Oka, Y. and Suzuki, K., 2013.).....	103
Figure 4.3: Block diagram representation of the reactor control system. (Courtesy of: Nuclear Reactor Kinetics and Plant Control, Oka, Y. and Suzuki, K., 2013.).....	105
Figure 4.4: Block diagram representation of the reactor control system. (Courtesy of: Nuclear Reactor Kinetics and Plant Control, Oka, Y. and Suzuki, K., 2013.).....	107