بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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
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Under the Supervision of

Prof. Dr. Mahmoud M. El-Metwally
M. Elmetwally
Professor
Electrical power and Machines Dep.
Faculty of Engineering, Cairo University

Prof. Dr. Ahmed A. Abouelsoud
Professor
Electronics and Communication
Engineering Dep.
Faculty of Engineering, , Cairo University

Prof. Dr. Mahmoud A. Farag
Professor
Electrical power and Machines Dep.
Faculty of Engineering, Cairo University

Prof. Dr. Said A. Kotb
Associate Professor
Nuclear Reactors Dep., Egyptian Atomic
Energy Authority, Egypt
S. Kotb

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Approved by the
Examining Committee

M. Elmetwally

Prof. Dr. Mahmoud M. El-Metwally Thesis Main Advisor

Prof. Dr. Ahmed A. Abouelsoud Advisor

Prof. Dr. Ahmed Bahgat Internal Examiner

A.Y. Abdelaziz

Prof. Dr. Almoataz Youssef External Examiner

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2021

Engineer's Name: Khaled Mohamed Rady El-Tohamy
Date of Birth: 8/08/1987
Nationality: Egyptian
E-mail: Khaled.mohamed.rady@outlook.com
Phone: 01155544225/01227822099
Address: 5th, GUPCO,500st., New Maadi, Cairo,Egypt

Registration Date: 1/10/2015
Awarding Date: …./…./2021
Degree: Doctor of Philosophy
Department: Electrical Power and Machines Engineering

Supervisors:

Prof. Dr. Mahmoud Mohamed Elmetwally
Faculty of Engineering, Cairo University
Prof. Dr. Ahmed Ali Abouelsoud
Faculty of Engineering, Cairo University
Prof. Dr. Mahmoud Ali Farag
Faculty of Engineering, Cairo University
Dr. Said Abdo Kotb
Nuclear Reactors Dep., Egyptian Atomic Energy Authority

Examiners:

Prof. Dr. Mahmoud M. El-Metwally (Thesis main advisor)
Faculty of Engineering, Cairo University
Prof. Dr. Ahmed Ali Abouelsoud (Advisor)
Faculty of Engineering, Cairo University
Prof. Dr. Ahmed Bahgat (Internal examiner)
Faculty of Engineering, Cairo University
Prof. Dr. Almoataz Youssef (External examiner)
Faculty of Engineering, Ain Shams University

Title of Thesis:

Advanced control of the Egyptian unified electrical grid with the impact of the nuclear power generation in Dabaa

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.

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.

Name: Khaled Mohamed Rady El-Tohamy   Date:

Signature:

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Dedication

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

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