Ареф Махмуд Махрос Амери Моделирование возобновляемых источников энергии при расчете токов короткого замыкания в локальных распределительных системах Египта

ОГЛАВЛЕНИЕ ДИССЕРТАЦИИ

кандидат наук Ареф Махмуд Махрос Амери

Abstract

Introduction

Chapter 1. Literature Review

1.1 Distribution Generator

1.2 DG Control methods

1.3 Modeling of PMSG Wind Power System

1.3.1 Wind turbine model

1.3.2 Modeling of PMSG

1.3.3 Modeling of back-to-back PWM Converter

1.4 LVRT control strategy

1.5 PV System Modelling

1.5.1 Photovoltaic Cell (PV)

1.5.2 Maximum power point tracking

1.6 Modeling of a battery energy storage

1.7 Multi-level converter

1.8 Microgrid

1.8.1 The Microgrid Concept

1.8.2 Control of Microgrids

1.8.2.1 Centralized control

1.8.2.2 Decentralized Control

1.9 Power flow of isolated microgrid

1.10 Fault current calculation

1.11 Electromagnetic Coupling Mathematical Model of SFCL

1.12 Inverter current control during fault

1.13 Smart Grid

Chapter 2. Protection Design Scheme of Grid Connected

PMSG Wind Turbine

2.1 Control Strategy

2.2 IEC Method

2.3 Zafarana wind speed

2.4 System description

2.5 Simulation studies

2.5.1 PMSG wind turbine connected to grid

2.5.2 PMSG wind farm connected to grid

Chapter 3. Digital Control strategy for SPWM MPPT of PV

System with Three-Phase NPC Three-Level Converter

3.1 System Modelling

3.2 Maximum Power Point Tracking (MPPT)

3.3 Three-level Neutral point Clamped converter (NPC)

3.4 Design of LCL filter

3.5 Sinusoidal pulse width modulation

3.6 Microcontroller

3.7 Control strategy

3.8 System Description

3.9 Simulation Results

3.9.1 LCL filter design

3.9.2 Maximum power curve

3.9.3 Case 1: Stand-alone PV system

3.9.4 Case 2: Grid connected PV system

Chapter 4. Transient analysis of AC and DC microgrid with

effective of SFCL

4.1 Microgrid System Configuration

4.2 System Description

4.3 Simulation Studies

Chapter 5. Short Current Calculation and Static Security Risk

for Grid-connected and Isolated Microgrid

5.1 Research Method

5.1.1 Power flow calculation

5.1.2 Fault current calculation

5.1.3 Operation Scenario of the distribution system during the fault

5.1.4 Static Security risk

5.1.5 Load Shedding Strategy

5.2 System under study

5.3 Results and Analysis

5.3.1 Grid-connected Microgrid

5.3.2 Isolated Microgrid

Conclusions and Suggestions for Future Work

Conclusions

Suggestions for Future Work

References

Appendix A

Appendix B