الآية:

{يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ}

{المجادلة:11}

DEDICATION

Gifting expressed to

Our mothers and fathers, to all teachers of Sudan University for Science and Technology, College of Engineering, School of Electrical and Nuclear Engineering.

ACKNOWLEDGEMENT

God thanks first and foremost, a good reconcile, His help, and on w

What open it to the completion of this thesis.

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ABSTRACT

This project presents an overview of the state of the art in reactive power compensation technologies. The principles of operation, design characteristics and application examples of VAR compensators implemented with thyristors and self-commutated converters are presented. Static VAR Generators are used to improve voltage regulation, stability, and power factor in ac transmission and distribution systems. Examples obtained from relevant applications describing the use of reactive power compensators implemented with new static VAR technologies are also described. A SIM Power toolbox in MATLAB 2016a is used to carry out simulations of the system under study and detailed results are shown to access the performance of SVC and STATCOM on the voltage of the system .

مستخلص

تناول هذا البحث التقنيات المستخدمة في تعويض القدرة الردية في انظمة نقل وتوزيع القدرة من حيث نظرية العمل و التصميم و والخصائص التشغيلية و تطبيقاتها .وكذلك اهمية تعويض القدرة الردية ودورالتعويض في تحسين معامل القدرة,واستقرارية الشبكة ,و تنظيم الجهد.

باستخدام برنامج MATLAB تم عمل مقارنة بين أحدث وأكثر التقنيات المستخدمة حالياً (STATCOM&SVC)وذلك بعرض الرسومات التي توضح أداء و تأثير كل منهما.

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LIST OF SYMBOLS

FACTS	FLEXBLE AC TRANSMISSION SYSTEM	
HVDC	HIGH VOLTAGE DC	
STATIC	SYNCHRONOUS COMPENSATOR	
DVR	DYNAMIC VOLTAGE RESTORS	
MEL	MINIMUM EXCITATION LIMIT	
URA	UNDEREXCITED REACTIVE AMPER	
UPCS	UNIFIED POWER FLOW CONTROLLERS	
TSC	THYRISTOR SWITHED CAPACITORS	
TCR	THYRISTOR CONTROLLED REACTOR	
TCSC	THYRISTOR CONTROLLED AND SERIES CAPACITOR	
SSSC	STATIC SYNCHRONOUS SERIES COMPENSATOR	
SVC	STATIC VAR COMPENSATOR	
FCTCR	FIXED CAPACITOR WITH THYRISTOR CONTROLLED REACTOR	
BIL	BASIC INSULATION LEVEL	
SSR	SUB SYNCHRONOUS RESONANCE	