بسم الله الرحمن الرحيم

Sudan University of Science and Technology
College of Graduate Studies

A study of Under-frequency Load Shedding Scheme (National Grid Model)

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A Thesis Submitted in Partial Fulfillment for the Degree of M.sc in Electrical Engineering (Power)

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بسم الله الرحمن الرحيم

{إ قرأ باسم ربِک الذي خلق(1) خلق الإنسان من علق(2) ا قرأ وربک الأكرم (3) الذي علم بال قلم (4) علم الإنسان ما لم يعلم(5) }

صدق الله العظيم

سورة العلق

Dedication

Dedicated
TO
My Parents

Acknowledgment

I would like to express my gratitude and appreciation to my supervisor, Ustaz Khamis Arbeesh, for his guidance and help in this work. Also thanks and appreciation are extended to all my helpful friends in Load Dispatch Centre (LDC) of The Sudanese Electricity Transmission Company (SETCO).

Abstract:

This research deals with the operation of Under-Frequency Load Shedding (UFLS) scheme during contingency period of the National Grid. The National Grid is modeled by using ETAP 7.0 software which is a modern electrical power flow program.

The analysis of the operation of UFLS scheme is carried out under different cases of overloading and disturbances to examine the dynamic performance of the power system. In these cases the settings of the Under-Frequency relays are changed to improve the performance of the power system. The typical frequency response of a system with a deficiency in generation is depicted.

A part of this research deals with UFLS relays. It explains and discusses principal components and the operation of the frequency relays which are used in the UFLS scheme of the National Grid.

المستخلص:

تعتبر منظومة تخفيض الأحمال لانخفاض التردد خط الدفاع الأخير لاستة قراريدة منظومات ال قدرة الكهربية في مواجهة الاهتزازات الكبيرة التي تعصف بتلك الشبكات. في هذا البحث تمت دراسة تشغيل منظومة تخفيض الأحمال المستخدمة في الشبكة ال قومية للكهرباء. لتحقيق هذا الهدف تم تمثيل منظومة الشبكة ال قومية باستخدام برنامج الحاسوب التحليلي ETAP7.0 وهو برنامج حديث لتمثيل وتحليل أداء منظومات ال قدرة الكهربائية.

هذه الدراسة وهذا التحليل لأداء المنظومة تم تحت ظروف تحميل وحالات اهتزاز مختلفة وذلك لاختبار أداء وثبات المنظومة. خلال تلك الاهتزازات تم تغيير ضبط منظومة تخفيض الحمولة لتحسين أداء واسستة قراريدة منظومة ال قدرة الكهربائية كمؤشر لأداء المنظومة ومن ثم تم رصد استجابة تردد المنظومة خلال تلك الاهتزازات.

في هذا البحث تمت أيضا منا قشة مكونات وطريقة عمل مرحلات التردد المستخدمة في منظومة خفض الحمولة في الشبكة ال قومية.

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