

DEDICATION

I dedicate this research to my Father, my Mother and my Brothers

ACKNOWLEDGMENTS

I would like to express my gratitude and appreciation to my supervisor, Dr. Abdulaziz Yousif Mohamed Abbas for his continues guidance and help in this work. Also thanks and appreciation are extended to Eng / Abdulrahman Abdullah Ahmed the Manager of Department of Analyzing and Planning in NEC Sudan and Eng / Alsayed Alamin Alsedeeq, Eng /Mustafa Mohammed Abdullah from Distribution Department in NEC Sudan to help me to estimate the data requested in this research

ABSTRACT

Reliability is a key aspect of power system design and planning and has been an area of active research for some time now. Reliability studies are performed to maximize the reliability, efficiency, and safety of an electric power system, depending on your particular needs, protective device coordination, short circuit, and load flow studies may be performed and incorporated with the reliability study. In many cases, a reliability study will include a site visit by a field engineer to assess some factors such as: location and placement of surge arresters, transformer sizing and loading data, equipment failure and reliability data, outage restoration and sectionalizing procedures, outage reporting databases. And following the site visit a comprehensive report is submitted discussing the findings and suggesting ways to improve overall reliability of the system. The economics of preventive maintenance and continued operation of older equipment are considered, including downtime, repair costs, and production losses, recommendations may include replacement of marginal equipment and/or equipment approaching the end of its service life.

This research presented the basic concepts of power system reliability of the assessment techniques and reliability indices objective. Also formula of calculation and factors affecting of indices are presented and study focused in distribution system. State space approach (Markov method) that can be used to analyze and assessment the reliability of distribution systems is presented and applied to study some cases for the purpose of comparison between the local network (NEC Sudan) and IEEE.

الملخص

الاعتمادية هي أحد الجوانب الرئيسية لتخطيط وتصميم نظم القوي الكهربائية ، وقد صارت من أكثر مجالات البحث النشط الآن . تجرى دراسات الاعتمادية لتحقيق أقصى قدر من الاعتمادية ، الكفاءة وسلامة نظام الطاقة الكهربائية ، تبعاً للاحتياجات الخاصة به من تنسيق أجهزة الحماية ، دوائر القصر ، ويمكن إجراء دراسات تدفق الحمل وتدمج مع دراسة الاعتمادية . في كثير من الحالات ، دراسة الاعتمادية تشمل زيارة المهندس الميداني للمواقع لتقييم بعض العوامل مثل : مو اقع ومواضع مانعات الصواعق ، حجم المحولات وبيانات تحميلها ، المعدات العاطلة وبيانات اعتماديتها، استعادة الانقطاع و إجراءات تقسيم الشبكة ، تقارير بيانات انقطاع الطاقة ، وبعد زيارة الموقع يعد تقرير شامل يقدم فيه نتائج بحثه واقتراح طرق تحسين الاعتمادية لكل النظام ، ويأخذ في الاعتبار اقتصاديات الصيانة الوقائية واستمرار تشغيل المعدات القديمة ، بما في ذلك التوقف ، وتكاليف الصيانة ، وفقدان الإنتاج ، ويمكن أن تشمل توصيات باستبدال معدات العاطلة و / أو معدات تقترب من نهاية عمرها الافتراضي.

قدم هذا البحث المفاهيم الأساسية لاعتمادية نظم القوي الكهربائية من مؤشرات الاعتمادية ، تعريفاتها وأهداف تقييمها ، التقنيات المستخدمة في التقييم ، المعادلات الرياضية المستخدمة لحسابها والعوامل المؤثرة عليها. وتركزت دراستنا في نظام التوزيع ، وقدم ت طريقة حيز الحالة التي يمكن استخدامها لتحليل اعتمادية نظم التوزيع، وطبقت هذه الطريقة لدراسة حالتين لغرض المقارنة بين الشبكة المحلية و IEEE.

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