الآيـــــة

أعوذُ باللهِ مِنَ الشيطَانِ الْرجِيمْ

بِسْمِ اللهِ الرْحمنِ الْرحِيمْ

﴿ اقْرَأْ بِاْ سِمَ ربِّكَ الَّذِيَ خلَقْ ﴿١﴾خلَقَ ٱلإنسِانَ مِن عَلَقْ ﴿٢﴾اقْرأْ وَربُّكَ
ٱلْأَكرم ﴿٣﴾الَّذِي عَلَّمَ بِالْقلَم ﴿٤﴾عَلَّمَ ٱلإنْسَانَ ما لَمَ يَعلَم ﴿5﴾ ﴾

العلق (1-5)

ABSTRACT

The effect of the line outage when rest of system is stable is called contingency study. The outage on the system may be for single line (N-1) contingency or for multiple lines (N-m) contingency where N the total number of lines and m the number of lines out the service. The study of contingency is essential process in planning, operating and control of power systems.

The main thrust of contingency studies carried out in power system control centers is to determine the steady state effects of outages. Large power systems require the analysis of all the credible contingence within a very short time so as to exercise the control in the short time available for corrective action.

Generally, the system continues to operate in the contingency condition for a considerable duration of time, on occurrence of a line outage. The altered voltage stability margins of all the load buses for the various contingency conditions are to be known prior to monitor and initiate emergency control action to avoid voltage collapse.

This study suggests an intelligent technique using *fuzzy logic control system* to assist in ranking the single contingency (N-1) which occur in the system. The suggested fuzzy logic approach was taken into consideration and applied to the national Sudanese grid. The results of the ranking was compared with reference results which already had ranked using NEPLAN program. The ranking results show that there are about twenty seven elements operate out of the permissible limits of violations in the system which is means that the network is not secure.

مُستخلَص

تأثير خروج احد الخطوط فى الشبكة فى حين بقاء بقية المنظومة مستقرة هذا مايطلق عليه دراسة حالة طوارئ الشبكة. وقد يكون هذا الخروج لخط واحد فقط (طوارئ (N-1)) وقد يكون لأكثر من خط (طوارئ (N-m)) حيث (N) عدد الخطوط الخطوط الكلية فى الشبكة و (m) عدد الخطوط خارج الخدمة. دراسة حالات طورارئ الشبكة يعتبراجراء اساسي فى عمليات التخطيط والتشغيل و التحكم فى نظم القدرة.

الثمرة الاساسية لدراسة حالات الطوارئ فى الشبكة التى تضمن فى أنظمة التحكم فى نظم القوى هى تحديد تأثير هذه الحالات على استقرارية الشبكة. وفى الأنظمة الكبيرة تكون الحوجة لتحليل كل حالات الخروج فى الشبكة وفى وقت قصير حتى يتأتى اتخاذ قرار التحكم فى أقل زمن ممكن لتصحيح الخطأ.

بصفة عامة يستطيع نظام القدرة العمل فى حين وجود حالات طوارئ فى الشبكة لفترة زمية معتبرة فى حالة خروج أحد الخطوط ولابد أن تكون حدود تغير استقرارية الجهد معلومة لدى مراقب الشبكة لاتخاذ اجراء التحكم اللازم تجنبًا لحدوث انهيار الجهد.

هذه الدراسة, تقترح أحد التقنيات الذكية التى تستخدم نظام التحكم المنطقى الغامض للمساهمة فى جدولة حالات خروج خط واحد من الشبكة (طورائ(N-1)). هذا النموذج المقترح تم تطبقيه على الشبكة السودانية القومية وتمت مقارنة نتائج هذه الجدولة بمثيلتها على البرنامج الخاص بتحليل نظم القوى (NEPLAN). وقد أظهرت نتائج الدارسة وجود عدد من الحالات (حوالى 27 حالة) تقع خارج نطاق المسموح به للقيم ممايعنى أن الشبكة غيرامنه.

DEDCATION

For my mother

The compassionate person who taught me the meanings of ambitious and responsibility.

For my father

The person who assist me with whole of his tenderness and generosity.

For my family members

Akram and Ihdaa, my well-beloved brother and sister.

For my supervisor Dr. Mohammed Osman Hassan...

Who was been the source which emanates with inspirational leadership and creativity to accomplish this work.

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Eng. Hiam Awad.

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