

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قال تعالى:

لَقَدْ كَانَ لَكُمْ فِي رَسُولِ اللَّهِ أُسْوَةٌ حَسَنَةٌ لِّمَن كَانَ يَرْجُوا اللَّهَ وَالْيَوْمَ الْآخِرَ وَذَكَرَ اللَّهَ كَثِيرًا (٢١)

صدق الله العظيم

سورة الأحزاب الآية 21

DEDICATION

To my bond in life...

To the gardens of roses in my heart...

To my Father and my Mother...

To my Moon, who leads me through the valley of darkness with
light of hope and support

Malaz Mohammed Massad

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ABSTRACT

Power system protection basic requirements are Selectivity, Stability, Speed, Sensitivity, Reliability, Economy and Adequateness. Protect transmission line with distance protection scheme sometimes suffers from overreach detection, when fault happens beyond the steady state reach setting.

Research studied distance protection scheme, then determined the cause of its overreach problem, and found that problem related with short transmission lines which have a value of system impedance ratio (SIR) more than 4.

Transmission line between Alshugura and Local Market substations is 5.3Km long (Sudanese National Grid) was taken as case study.

Research made a solution to problem of distance protection over reach in short transmission line by applied line differential protection scheme.

مستخلص

هنالك معايير يجب ان تتوفر في منظومات الحماية عموماً هي الاختيارية، الاستقرارية، الثبات، السرعة، الحساسية، الاقتصاد والملائمة. حماية خطوط النقل بواسطة نظام الحماية المسافية لديه مشاكل منها فصل الاعطال خارج منطقة الحماية الخاصة به، بدون اختيارية او استقرارية.

في هذا البحث تمت دراسة الحماية المسافية بشكل واسع . ووجد ان هذه المشكلة متعلقة بحماية الخطوط القصيرة والتي تكون فيها قيمة نسبة معاوقة المصدر الى معاوقة خط النقل اكبر من 4 ، تم اخذ خط النقل الواصل بين محطة الشجرة والسوق المحلي 5.3 كلم كحالة للدراسة. البحث ايضا يطرح حلول للمشكلة باستخدام الحماية التفاضلية كبديل للحماية المسافية عند حماية خطوط النقل الكهربائية القصيرة مع مراعاة مزايا وعيوب كل من الطريقتين.

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LIST OF ABRIVIATIONS:

System impedance ratio	SIR
Current transformer	C.T
Voltage transformer	V.T
A capacitor voltage transformer	CVT
Line differential protection	87L