

**DESIGN AND IMPLEMENTATION OF ALGORITHM
FOR PROTECTION OF DG BASED ELECTRIC POWER
NETWORKS**



BY

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Abstract

In this research work an intelligent and fault tolerant protection scheme for electric power networks considering the penetration of large scale distributed generation (DG) is presented. Electricity is required in nearly every field of the modern life. Thus a reliable and fault tolerant system is required for the generation, transmission and distribution of electric power. The earliest systems used to distribute electric power were radial in nature working on a single source and sink mechanism. However in modern era, the scheme of DGs are gaining wide importance because of their ability to include renewable and alternate energy resources as generation and thus producing a cleaner and greener energy.

Usually protection of electric systems is carried out by using fuses. Fuses are not intelligent and their whole operation is defined by fault clearing time and min melting point. Relays on the other hand are intelligent and are employed to sense faults and trip CBs. When the scheme of the system changes from radial to distributed, the coordination of protection devices is lost and therefore, whole protection scheme may collapse. Also coordination is lost by adding more DG unit to the existing DG system as the values of fault current changes for relays.

In the implemented scheme, the coordination between various protection devices will hold even after the addition or modification of a distributed generation unit. Load flow analysis and short circuit analysis is performed after each network modification and the results are fed to a master relay that coordinates with all the other relays in the power system. The proposed scheme is implemented using MATLAB and the results validate the optimal functioning of the proposed scheme. Thus, the successful implementation of proposed scheme ensures the reliable protection of the power network considering large scale distributed generation.

I dedicate my work to my family especially thankful to my sister Ms. Kiran Siraj whose constant support throughout made it possible for me to complete my work. Special thanks to my advisor and my teacher DR Abdul Aziz Bhatti and all my colleagues. I hope that my work is useful for my countrymen and to all humanity.

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