Chapter 1

Introduction

1-1 Overview:

Power transmission and distribution systems are used to interconnect electrical power production systems and to provide a means of delivering electrical power from the generating station to its point of utilization. Most electrical power systems are interconnected with one another in a parallel circuit arrangement. These interconnections of power production systems are monitored and controlled, in most cases, by a computerized control center. Such control centers provide a means of data collection and recording, system monitoring, frequency control, and signaling. Computers have become an important means of assuring the efficient operation of electrical power systems.

1-2 Research problem:

Due to the risk of circuit breakers operation caused by the overloaded lines, the feeder automation systems are used to cover the proper operations of the circuit breakers without any risk occurred to operator engineers.

1-3 Research Objectives:

The main objectives of this research is to

- Study the distribution automation system and how can be operated.
- Understand the step7-300 software PLC programming to simulate application system.
- To simulate the feeder automation in substation system.

1-4 Research methodology:

A simulation software programming covering a feeder automation substation of Abdu Gaffer in Omdurman area.

1-5 Research Outlines:

This research consists of an abstract and five chapters.

Chapter (1): cover an introduction that contains overview, research problem, research objectives, research methodology & research outlines.

Where **chapter (2):** deals with the distribution system includes an introduction, underground distribution, high voltage direct current transmission, parallel operation of power systems, distribution system components, distribution system classifications & distribution devices.

Chapter (3): covers the distribution system automation consists of an introduction, distribution management system, supervisory control and data acquisition system (SCADA), SCADA Operation, distribution system classifications & distribution automation system implementation.

Chapter (4): illustrates the Feeder Automation of Abdu Gaffer substation that contains of an introduction, operating principle of circuit breaker, bus bar arrangements, system components, system operation & system simulation.

Chapter (5): comprises of conclusion that consists of the conclusion, recommendations & references.