PREFACE

Interruption in power supply is unaffordable with the increasing industrialization and dependence of human life on it. To maintain the continuity of supply protective measures are very important. Protection system plays very vital role in maintaining the stability of electric power system. Their role is to detect the presence of fault and to assist in isolating it from the healthy part of the system. In spite of so many years in practice; conventional techniques of protection are still lacking to solve some of the problems. Intelligent techniques are showing their potential to solve these problems. Artificial Neural Network (ANN) and fuzzy system are such intelligent techniques. ANNs mimic the human brain in a crude way on the other hand fuzzy technique is inspired by process of human judgment without any fixed decision boundary. ANNs have proved their effectiveness for image and signal processing tasks. Power engineers are investigating this capability of ANNs to solve protection problems. In this thesis detection and classification of power system faults with ANN is suggested; also the ANN like model of Adaptive Network Fuzzy Inference System (ANFIS) has been tried for some application of power system.

The thesis is organized in eight chapters. Chapter-1 introduces the aspects of machine intelligence in the purview of neural networks and fuzzy systems. A brief review of literature in the field of neural network, fuzzy theory and their applications in power engineering is also presented in this chapter. Chapter-2 presents the concepts of artificial neural network. Most of the possible architectures, neuron models and various learning methods are also discussed here. Basics of fuzzy set theory, operations on fuzzy sets and fuzzy reasoning methods are introduced in Chapter-3.

Chapter-4 applies the concepts presented in Chapter-2 and Chapter-3 to harmonic filtering tasks. Details of Adaptive Network Fuzzy Inference System are also presented in the same chapter. These applications show the signal processing strengths of neural network and fuzzy system approaches. In
Chapter-5. detection of transformer switching is presented with the feedforward and feedback neural networks. Detection of this switching event has been done with preprocessing and without preprocessing of input data. Chapter-6 covers the transmission line fault detection and classification with Elman neural network. Data window formation and suitability of Elman network for temporal sequences are also discussed here. Finally Chapter-7 concludes the work and Chapter-8 suggests possible directions of extension of the work presented in this thesis.

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