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Identification of Flicker Sources Using Wavelet and ANN

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ABSTRACT

In this paper a new method based on wavelet and ANN has been presented to identify the flicker source. This method is presented and tested for radial networks only. This method has been implemented on the proposed network, and the results shows perfect estimation.

Keywords: *flicker, wavelet, ANN*

1. INTRODUCTION

Flicker is an important power quality indexes. Due to the growth of customers request for high quality electric power, because of their sensitive loads, the need to high quality power which covers the standards is increased. Based on the reports, from the system providers, the flicker and voltage fluctuations are the most important issues for customers.

Voltage fluctuation is the periodical or random varies of voltage magnitude, and usually varies between 90% to 110% of the nominal voltage. Flicker is a visible change in light of lamps based on fast fluctuations of voltage [1]. In addition to uncomfortability of human eyes, flicker is harmful for motors and sensitive loads.

In the case of flicker, there are two issues which have been studied in the literatures. One of the issues is the parameters which should be measured to identify the flicker. The other issue is the identification of flicker source in network. The source of flicker is important for utility to find which load is responsible for measured flicker [2]. The main quantities which are used are voltage and current of specified places [3]. The place of measurements is another issue which is important in the case of identification flicker source.

In [4], a lookup method has been presented to detect the flicker sources. In [4], the flicker source has been simulated such as arc furnace. In [4], the detection of flicker source has been done by detecting the direction of propagation of flicker.

In [2], the flicker source identification has been done by identification of interharmonic power direction. In [2], has been claimed that if power signal entails interharmonics, the power signals magnitude will oscillates and flicker will be appeared. The flicker source in [2] has been simulated by induction motor and variable frequency drive.

In [5], the flicker source detection has been done by using flicker power measurements. Flicker power's sign shows the direction of flicker and its magnitude shows the source of flicker.

In this paper, a method based on wavelet and ANN has been presented to identify the flicker source. The wavelet has been used to identify the suitable features to detect the flicker source. ANN has been used to identify the flicker source. The ANN has been trained with suitable data, and then it has been used to detection. Two features have been selected, the results have been presented, and two selected features have been compared together.

2. PROPOSED METHOD

In this paper a method to identification of flicker resource has been presented. This method has been presented and tested for radial networks only. To detection of flicker source, the current of the head of each radial has been measured and stored. Due to the current waveform, the source has been identified.
In this method the wavelet and ANN toolbox of MATLAB software has been used. At first, the radial network has been simulated in Simulink of MATLAB software. The simulated radial network has been shown in Fig-1.