INTELLIGENT POWER QUALITY MONITORING SYSTEM

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"Power Quality" (PQ) is a term often used in relation with unwanted disturbances of the electricity supply. The growing use of electrical equipment which are susceptible to power quality disturbances, has triggered an increased interest in power quality over the last couple of years. This paper presents a novel Intelligent Power Quality Monitoring System (IPQMS), which captures and classifies the PQ disturbances occurring in electrical power systems. It is also capable of tracking the harmonic disturbance sources.

The IPQMS analyse the power quality disturbances in two stages. The first stage detects and classifies the power quality disturbances. Although the existing techniques are capable of automatically identifying and classifying power quality disturbances, the problem of one disturbance superimposed on another disturbance has never been resolved. The IPQMS proposed in the paper uses an original technique to detect and extract the disturbance from the sampled voltage waveform, even if it is superimposed on an already existing disturbance. In addition, a disturbance classification method based on a Self-Adaptive Artificial Neural Network (SAANN) is presented. The capability of SAANN to learn from the disturbances that are experienced, is used to gain the knowledge of an expert in achieving this successfully. The IPQMS also deals with the harmonic distortion and proposes a technique for evaluating the contribution of several harmonic sources on total harmonic distortion. This technique is then used to locate the dominant harmonic sources.