SHUNT ACTIVE POWER FILTER CONTROL
USING RADIAL BASIS FUNCTION NEURAL NETWORK
BASED ON INSTANTANEOUS P-Q THEORY

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ABSTRACT

Generally, Fourier Transform is used to analyze a distorted wave from power line. To extract harmonics current component, low pass filter is used to eliminate the fundamental wave before each harmonics component is detected. This conventional approach is difficult to implement because deviation of power system frequency may be occurred. In addition, FFT method requires input data for more than one cycle of the signal samples for computation. Therefore, more delay time will appear. In order to improve the processing speed and simplify harmonics detection process, the neural network algorithm proposed in this research harmonics current approximation method used Radial Basis Function (RBF) neural network. The radial basis function neural network (RBFNN) type is utilized for controlling the injection compensation current of shunt active power filter (APF) for harmonics mitigation. The advantages of RBF over the other neural network models are simple structure where the activation function and learning speed can be increased. Using this method, total harmonics distortion (THD) values of distorted current decreased from 27.98%, 27.7% and 30.29% became fewer than 5%. The good result indicate that shunt active filter control using RBF neural network could be implemented well for approximating and detecting harmonics current component.

Key Words- RBFNN, harmonics extraction, shunt active power filter