

## Three-phase switched capacitor active power filter with modified artificial neural network and flexible-band hysteresis.

### ABSTRACT

This paper presents design and development of a three-phase switched capacitor active power filter (APF) to reduce line-current harmonics and operate in-phase with line voltage. Its control design combines a modified artificial neural network (ANN) harmonic detection technique and flexible-band hysteresis current control. The modified ANN with a suitable learning rate produces good and fast harmonic reference current for use in the switching algorithm, which performs flexible-band through embedded with band and without band hysteresis current control. MATLAB Simulink software verified the proposed APF's topology and controller. A laboratory-built three-phase switched capacitor APF tested its feasibility. Simulation and experimental results verified its performance. It compensated harmonic current well, and the source current waveform became almost sinusoidal with near unity power factor. The results show that the three-phase switched capacitor APF with the modified ANN and the digital flexible-band hysteresis current algorithms could reduce THD and could increase power factor of the system.

**Keyword:** Active Power Filter; Artificial Neural Network; Hysteresis; Harmonic; Power Factor.