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# A Transformer Vibration Signal Separation Method Based on BP Neural Network

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Abstract: Power transformer is one of the most important electrical equipment in power system and its reliability is very important to power systems. Therefore, the transformer condition monitoring and fault diagnosis have been paid a lot of attention to by the researchers. The mechanical fault diagnosis method based on the vibration signals of transformer has been widely studied because the measurement system has no direct electrical connection with the transformer and has strong anti-interference ability. The traditional vibration signal analysis method generally analyzes the mixed signals on the surface of transformer oil tank, and can't effectively evaluate the mechanical state of winding and core. This paper presents a transformer vibration signal separation method based on BP neural network in order to evaluate the mechanical status of winding and core separately. In this paper, the vibration mechanism of transformer winding and core is analyzed and the theory of BP neural network is introduced. Transformer was applied no-load test, steady state short-circuit test and load test. The vibration generated in the no-load test is only produced by the core. The vibration generated in the steady state short-circuit test is only generated by the winding. Using no-load test vibration signals as output layer and using load test vibration signals as input layer, the core BP neural network was built. And using steady state short-circuit test vibration signals as output layer and using load test vibration signals as input layer, the winding BP neural network was built. The core waveform similarity coefficient is 0.813 and the winding waveform similarity coefficient is 0.834, which provide an important technical means for effectively evaluating the mechanical status of winding and core separately.
Keywords: Transformer; BP neural network; Winding; Core; Separation of the vibration signal

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