

This paper proposes a novel method of interturn fault detection based on measurement of pulsewidth modulation (PWM) ripple current. The method uses the ripple current generated by the switching inverter as a means to detect interturn fault. High-frequency (HF) impedance behavior of healthy and faulted windings is analyzed and modeled, and ripple current signature due to interturn faults is quantified. A simple analog circuit is designed to extract the PWM ripple current via a bandpass (BP) filter and a root-mean-square (RMS) detector for fault detection. In addition, this method can also identify the faulted phase, which can be used for fault mitigation strategies. The method is tested experimentally on a five-phase permanent-magnet (PM) machine drive.