Wavelet-based analysis of MCSA for fault detection in electrical machine

ABSTRACT

Early detection of irregularity in electrical machines is important because of their diversity of use in different fields. A proper fault detection scheme helps to stop the propagation of failure or limits its escalation to severe degrees, and thus it prevents unscheduled downtimes that cause loss of production and financial income. Among different modes of failures that may occur in the electrical machines, the rotor-related faults are around 20%. Successful detection of any failure in electrical machines is achieved by using a suitable condition monitoring followed by accurate signal processing techniques to extract the fault features. This article aims to present the extraction of features appearing in current signals using wavelet analysis when there is a rotor fault of eccentricity and broken rotor bar. In this respect, a brief explanation on rotor failures and different methods of condition monitoring with the purpose of rotor fault detection is provided. Then, motor current signature analysis, the fault-related features appeared in the current spectrum and wavelet transform analyses of the signal to extract these features are explained. Finally, two case studies involving the wavelet analysis of the current signal for the detection of rotor eccentricity and broken rotor bar are presented.