Abstract

Today, induction machines are playing, thanks to their robustness, an important role in world industries. Although they are quite reliable, they have become the target of various types of defects. Thus, for a long time, many research laboratories have been focusing their works on the theme of diagnosis in order to find the most efficient technique to predict a fault in an early stage and to avoid an unplanned stopping in the chain of production and costs ensuing. In this paper, an approach called Park's vector product approach (PVPA) was proposed which was endowed with a dominant sensitivity in the case in which there would be rotor or stator faults. To show its high sensitivity, it was compared with the classical methods such as motor current signature analysis (MCSA) and techniques studied in recent publications such as motor square current signature analysis (MSCSA), Park's vector square modulus (PVSM) and Park-Hilbert (P-H) ($PVSM_{P-H}$). The proposed technique was based on three main steps. First, the three-phase currents of the induction motor led to a Park's vector. Secondly, the proposed PVPA was calculated to show the distinguishing spectral signatures of each default and specific frequencies. Finally, simulation and experimental results were presented to confirm the theoretical assumptions