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SOFT COMPUTING TECHNIQUES FOR DETECTION AND DIAGNOSIS OF FAULTS IN LOW VOLTAGE INDUCTION MOTORS - STATE OF THE ART

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ABSTRACT

The domain of fault detection and diagnosis is intensely occupied with numerous research studies. The fault diagnosis community has witnessed development of diagnostic techniques from traditional machine theory and model based techniques to recent artificial intelligence (AI) techniques. The traditional techniques were found engraved with handicaps of ambiguities and limitations in detection and diagnosis in case of multiplicity of faults. To overcome the observed limitations the analog/digital signal spectrum analysis using soft computing techniques gained momentum and prominence. They secured the focus of researchers because of their enhanced level of accuracy as compared to traditional techniques. The soft computing based techniques stepped through frequency domain, time-frequency domain, and higher order spectral analysis to recent artificial intelligence (AI) techniques like fuzzy logic, artificial neural network (ANN), and genetic algorithm (GA). The tools employed in these techniques vary from the use of sensors to steady state spectral components of the electrical and mechanical quantities. This paper presents a brief analysis of the state of art in this domain. The cited contributions were published in most relevant journals and specific conferences. It is expected that this manuscript pinpoints the latest trend and limitations observed in this regard.

KEYWORDS: Ant Clustering, Discrete Wavelet Transform (DWT), Higher Order Spectrum (HOS), Multiple Signal Classification (MUSIC), Principle Slot Harmonics (PSH), Vibration Analysis

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