ADJUSTABLE SPEED DRIVE BEARING FAULT DETECTION VIA SUPPORT VECTOR MACHINE INCORPORATING FEATURE SELECTION USING GENETIC ALGORITHM

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ABSTRACT

This dissertation presents a novel method to detect bearing defects in Adjustable Speed Drives (ASD's), which are increasingly used in many commercial and industrial applications. The harmonics in pulse-width-modulation (PWM) input voltage waveforms and EMI noise in ASD systems complicate the detection of bearing-fault-induced frequency components in the current signals. The proposed method accomplishes bearing fault detection in ASD's by combining Motor Current Signature Analysis (MCSA), Wavelet Packet Decomposition (WPD), a Genetic Algorithm (GA), and a Support Vector Machine (SVM). The SVM in conjunction with the GA is applied to the rms values of the wavelet packet coefficients to obtain significant wavelet packet nodes which produce optimal classifiers for classifying both healthy and defective bearings in ASD systems.