Fault diagnosis of Rotating Machinery using Vibration Measurement: Application of the Wavelet Transform

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Abstract

Vibration analysis is a key element of predictive maintenance of rotating machines. Several signal analysis methods are used to obtain useful information from vibration signatures. This signal highlights the changes in time domain (root mean square), in the frequency spectrum (Fourier Transform) and in the time-frequency (Short Time Fourier Transform and Wavelet Transform). Currently, the most of these methods use spectral analysis based on Fourier Transform (FT). However, these methods exhibit some limitations: it is the case of non-stationary signals. In the present paper, we are interested to apply wavelet transform (WT) to the vibration signal analysis. This article investigates the use of different mother wavelet functions for faults diagnosis. The results demonstrate the possibility of using different mother wavelets in rotary systems diagnosis detecting and locating different rotating machinery faults. The results are tested by the Matlab code.

Keywords:
Vibration analysis, Predictive Maintenance, Fault diagnosis, Fourier Transform, wavelet transforms.