

Selection of Wavelet Decomposition Levels for Vibration Monitoring of Rotating Machinery

Hocine BENDJAMA, Daoud Idiou, Kaddour Gherfi, Yazid Laib

Abstract : The vibration signal of a rotating machine always carries the dynamic information of the machine. Its analysis is very useful for the condition monitoring and fault diagnosis. Many signal analysis methods are able to extract useful information from vibration data. In this paper, bearing fault diagnosis is performed using Wavelet Transform (WT) and Parseval's theorem. The WT is used to decompose the original signal into several signals in order to obtain multiple data series at different resolutions. The fault can be detected from a given level of resolution. For this purpose, Parseval's theorem is used as an evaluation criterion to select the optimal level. Associated to envelope analysis, it allows clear visualization of fault frequencies. Vibration signals from a pilot scale are used to demonstrate the usefulness of the proposed method. The results of the application in inner and outer races bearing diagnosis are satisfactory.

Keywords : fault diagnosis; wavelet transform; Parseval's theorem; bearing.