

演講公告

時間：2008/12/10 (三) 下午 2:30~3:30

地點：中央大學 太遙中心 R3-112

演講人：吳天堯 博士 (中央大學數據中心助理研究員、機械系兼任助理教授)

講題：Misalignment Diagnosis of Rotating Machinery through Vibration Analysis via Hybrid EEMD and EMD approach

Abstract

The objective of this research is to investigate the feasibility of utilizing the hybrid method of Ensemble Empirical Mode Decomposition (EEMD) and pure Empirical Mode Decomposition (EMD) to efficiently decompose the complicated vibration signals of rotating machinery into finite number of Intrinsic Mode Functions (IMFs), so that the fault characteristics of the misaligned shaft can be examined in the time-frequency Hilbert spectrum as well as the marginal Hilbert spectrum. The intrawave frequency modulation (FM) phenomenon can be observed in the time-frequency Hilbert spectrum through Hilbert-Huang Transform (HHT) technique. This nonlinear behavior of the vibration signal indicates the levels of shaft misalignment. The fault characteristic of shaft misalignment is also featured by amplitude modulation (AM) in the information-contained IMF components that are extracted by the significance test. Through performing the envelope analysis on the information-contained IMF, the marginal Hilbert spectrum exhibits that the levels of amplitude modulation in the IMF depict the levels of shaft misalignment. A test bed of rotor-bearing system is performed to illustrate both the parallel and angular shaft misalignment conditions as well as the healthy condition. The analysis results of the measured vibration signals show that the proposed approach is capable of diagnosing the misaligned fault of the shaft in rotating machinery and providing more meaningful physical insight compared with the conventional methods.

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