



Covariance Driven Subspace Identification Technique for Continuous Modal Parameters Identification of Sutong Bridge.

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Abstract

In order to allow a continuous online monitoring of modal frequencies and damping ratios, and to provide a good damage detection technique, covariance driven subspace identification (COSSI) technique with Empirical mode decomposition (EMD) as a filter for frequency decomposition and change for non-linear and non-stationary signals, is adopted for signal processing. This method provides advanced capabilities for modal parameter identification for continuous online modal parameter identification. Sutong Bridge, a long span cable stayed bridge is taken as a case study and the proposed method is applied. The results validates that the proposed method provides an accurate tracking of modal parameters such as damping coefficients and frequencies on continuous real life data.

Keywords: COSSI ; EMD ; Cable Stayed Bridge.

1. Introduction

Road transportation being an important mode of transportation throughout the world plays a key role in passenger and freight transportation. The economic development is directly and strongly related to the availability of effectual transportation system. Bridges are the most critical structural component in road transportation system, due to its strategic, economic and aesthetic importance, to allow uninterrupted flow of traffic during its design life.

As the civil infrastructure is aging with time, the importance for an economically sustainable maintenance also increases, because of the traditional visual inspection techniques, which is time consuming and expensive, we need an efficient structural health monitoring system.

The advancement in technology and competition among countries for constructing long span bridges, specially the cable stayed bridges have paved the way for the new generation civil structures which may be referred as Third generation structures, in order to full fill the latest technological requirement of third generation civil engineering structures, specially the long span bridges, continuous monitoring system which can control their own health and equipped with an integrated monitoring system that will be able to detect structural deterioration and damage shall be installed, that will provide an