Analysis Rotor Bearing System Dynamic Interaction with Bearing Supports

Authors : V. T. Ngo, D. M. Xie

Abstract : Frequently, in the design of machines, some of parameters that directly affect the rotor dynamics of the machines are not accurately known. In particular, bearing stiffness support is one such parameter. One of the most basic principles to grasp in rotor dynamics is the influence of the bearing stiffness on the critical speeds and mode shapes associated with a rotor-bearing system. Taking a rig shafting as an example, this paper studies the lateral vibration of the rotor with multi-degree-of-freedom by using Finite Element Method (FEM). The FEM model is created and the eigenvalues and eigenvectors are calculated and analyzed to find natural frequencies, critical speeds, mode shapes. Then critical speeds and mode shapes are analyzed by set bearing stiffness changes. The model permitted to identify the critical speeds and bearings that have an important influence on the vibration behavior.