

Detection of a Rotor Crack by a Periodic Excitation

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ABSTRACT

Dynamic characteristics of a cracked rotor with a periodic excitation force different from the unbalance force are investigated. Due to the open-close mechanism of the crack, the equations of motion of a cracked rotor have linear and nonlinear parametric terms. When a periodic excitation force applied to the cracked rotor, various kinds of resonances which are not observed in a symmetric rotor and an asymmetric rotor occur due to the unique vibration characteristics of a crack. These results enable us to detect a crack on-line without stopping the system.

Keywords: Rotor crack, Detection, Periodic force, Nonlinear resonance