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论文

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### 非线性油膜支承裂纹转子振动特性分析

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### ANALYSIS ON THE VIBRATION CHARACTERISTICS OF CRACKED ROTOR WITH NONLINEAR OIL FILM BEARING

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摘要

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**摘要** 以具有无限长轴承和无限短轴承支承的横向裂纹转子为研究对象,分析在非线性油膜力与横向裂纹联合作用时,Jeffcott转子的动力特性,并将其与刚性支承情况进行比较。结果表明轴承油膜力的存在对裂纹转子的振动影响较大,一般将降低转子的振动,这样势必增加转子裂纹故障诊断的难度。所以,在进行裂纹转子的故障诊断时,必须考虑到支承条件的影响,建立合理的动力学模型

**关键词:** 裂纹转子 故障诊断 油膜力 轴承 动力学模型

**Abstract:** The dynamic characteristics of cracked rotors and their early fault diagnosis are one of the key tasks of rotating machinery, which have been focused by many researchers. In this paper, a rotor with a transverse crack, supported on a nonlinear oil film bearing, is investigated. The bearing is considered as a long one or a short one. With consideration of the crack and the nonlinear oil film force together, the movement equation is set up and solved by the Newmark method. And their spectra are compared with the rigid support case. The results show that the oil film force affects the vibration of the cracked rotor heavily, and always reduces it. This will make it more difficult to diagnose its early faults. So when a cracked rotor is going to be studied, the conditions of bearing must be taken into account and a reasonable nonlinear dynamic model should be set up.

**Keywords:** cracked rotor fault diagnosis oil film force bearing dynamic model

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