

## **INSTABILITY OF A ROTATING PRE-TWISTED BLADE WITH A CRACK**

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### **ABSTRACT**

This paper investigates the variations in dynamic stability of a cracked rotating blade. The equations of the rotating cracked blade system are formulated using Hamilton's principle and Galerkin's method. The regions of instability in this cracked system are identified by means of the multiple scales perturbation method. The numerical results indicate that the crack effect not only affect the dynamic characteristics but also change dynamic instability significantly. Furthermore, it is shown that the stability regions of a cracked rotating blade system are significantly dependent on the rotational speed, pre-twisted angle, and crack depth.

**Keywords:** dynamic stability, pre-twisted blade, crack