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# Startup Dynamic Behaviour of a Jeffcott Rotor

**H. Diken and K. Alnefaie**

*King Abdulaziz University, Mechanical Engineering Department, P.O. Box 80204, Jeddah, 21589, Saudi Arabia*

(Received 3 October 2004; accepted 4 May 2005)

In this study, the dynamic behaviour of a Jeffcott rotor during startup is analysed. Equations of a Jeffcott rotor model are obtained assuming that rotor speed is not constant. Startup speed is assumed to have a second order control system transfer function. Numerical calculations show that if the rotor is running in a subcritical condition, maximum whirl radius is reached before the rotor reaches the critical speed. If the rotor is running in a supercritical condition, the maximum whirl radius is reached after the rotor passes the critical speed. An overshoot of the startup speed significantly increases the value of the maximum whirl radius. It is also observed that, for a supercritical startup, the whirl radius has a cyclic behaviour before it reaches a steady state value.

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