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## Floating ring squeeze film damper: Theoretical analysis

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### Abstract

The non-linear characteristics of squeeze film dampers can frequently promote multi-stable operation, e.g. jump, or aperiodic response in rotating machinery. Such undesirable operation can sometimes be avoided in rigid rotor systems by replacing the rigidly supported damper housing with a flexibly mounted rigid ring or 'floating' ring, but its applicability to flexible rotor systems is uncertain. This paper investigates theoretically the potential of such a modified damper in avoiding aperiodic response in a flexible rotor rig, built to validate theoretical predictions. Parameters investigated include the stiffness of the damper ring mount, its mass and its damping for various unbalance loads. For the parameter range investigated, the frequency response was highly dependent on the stiffness and the unbalance, somewhat dependent on the mass, and virtually insensitive to the damping. While aperiodic solutions could be avoided, a careful choice of parameters is needed to avoid excessive vibrations. © 2000 Elsevier Science Ltd. All rights reserved.

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