Air-Hammer Instability of Externally Pressurized Compressible-Fluid Bearings

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ABSTRACT

The pneumatic stability of an externally pressurized gas bearing was investigated using perturbation testing. Bode plots were used to determine the onset of instability, and full-spectrum cascade plots were used to determine the air hammer vibration frequency. The data demonstrate that air hammer is a nonsynchronous excitation of the system resonant frequency and derives its driving forces and energy from the compressible fluid supply. A discussion of air hammer is given.

Keywords: Air Hammer, Gas Bearings, Pneumatic Instability.