

Comparison of the Dynamic Characteristics of Active and Passive Hybrid Bearings

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Abstract : One of the ways of reducing vibroactivity of rotor systems is to apply active hybrid bearings. Their design allows correction of the rotor's location by means of separately controlling the supply pressure of the lubricant into the friction area. In a most simple case, the control system is based on a P-regulator. Increase of the gain coefficient allows decreasing the amplitude of rotor's vibrations. The same effect can be achieved by means of increasing the pressure in the collector of a traditional passive hybrid bearing. However, these approaches affect the dynamic characteristics of the bearing differently. Theoretical studies show that the increase of the gain coefficient of an active bearing increases the stiffness of the bearing, as well as the increase of the pressure in the collector. Nevertheless, in case of a passive bearing, the damping properties deteriorate, whereas the active hybrid bearings obtain higher damping properties, which allow effectively providing the energy dissipation of the rotor vibrations and reducing the load on the constructional elements of a machine.

Keywords : active bearings, control system, damping, hybrid bearings, stiffness

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