Multi-physical Simulation Of Aerostatic Bearings

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Abstract

Because of their zero friction and wear aerostatic bearings are widely employed in applications where very high precision of positioning is required, e.g, slideways and rotary tables for machine tools, synchrotrons and coordinate measuring machines, roundness tester, and other forms of scientific measuring equipment. Although extensive research has been performed, there is an increasing demand to enhance the performance and accuracy of this kind of supports. The use of multi-physical models represents a valuable tool to obtain accurate design and prediction of aerostatic bearings performance. This kind of analysis makes it possible to obtain almost perfect matches between numerical and experimental data and identify the main geometrical and physical causes of error exhibited by conventional models based on Reynolds equations. This paper presents a multi-physical analysis of an aerostatic bearing to shed light on which are the main sources of error that could be encounter in simulating this kind of support by using classical approaches.

Reference

Comment from the Program Committee:
Teh use of comsol is not clearly explained in the abstract.

Figures used in the abstract

Figure 1