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On the Numerical and Experimental Analysis of Internal Pressure in Air Bearings

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Abstract : Dynamics of a rotor supported by air bearings is strongly depends on the pressure distribution between the rotor and the bearing. In this study, internal pressure in air bearings is numerical and experimental analyzed for different radial clearances. Firstly the pressure distribution between rotor and bearing is modeled using Reynold's equation and this model is solved numerically. The rotor-bearing system is also modeled in four degree of freedom and it is simulated for different radial clearances. Then, in order to validate numerical results, a test rig is designed and the rotor bearing system is run under the same operational conditions. Pressure signals of left and right bearings are recorded. Internal pressure variations are compared for numerical and experimental results for different radial clearances.

Keywords : air bearing, internal pressure, Reynold’s equation, rotor
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