Foil Bearing Stiffness Estimation with Pseudospectral Scheme

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Abstract : Compliant foil gas lubricated bearings are used for the support of light loads in the order of few kilograms at high speeds, in the order of 50,000 RPM. The stiffness of the foil bearings depends both on the stiffness of the compliant foil and on the lubricating gas film. The stiffness of the bearings plays a crucial role in the stable operation of the supported rotor over a range of speeds. This paper describes a numerical approach to estimate the stiffness of the bearings using pseudo spectral scheme. Methodology to obtain the stiffness of the foil bearing as a function of weight of the shaft is given and the results are presented.

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Keywords : foil bearing, simulation, numerical, stiffness estimation

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020