Reliability of a Hydrodynamic Journal Bearing

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Résumé en anglais	Journal fluid bearings are widely used in industry due to their static and dynamic behavior and their very low coefficient of friction. The technical requirements to improve the new technologies design are increasingly focused on the indicators of dependability of systems and machines. Then, it is necessary to develop a methodology to study the reliability of bearings in order to improve and to evaluate their design quality. Few works are referenced in literature concerning the estimation of the reliability of journal fluid bearings. This paper deals with a methodology to study the failure probability of a hydrodynamic journal bearing. An analytical approach is proposed to calculate static characteristics in using the Reynolds equation. The commonly methods used in structural reliability such as FORM (First Order Reliability Method), SORM (Second Order Reliability Method) and Monte Carlo are developed to estimate the failure probability. The function of performance bounding two domains (domain of safety and domain of failure) is estimated for several geometrical configurations of a hydrodynamic journal bearing (long journal bearings with the hypotheses of Sommerfeld, Gumbel and Reynolds, and a short journal bearing with the hypothesis of Gumbel).
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