

STABILITY OF TILTING 5-PAD JOURNAL BEARING

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ABSTRACT

In the journal bearing systems of modern high speed rotating machinery the radial tilting-pad journal bearings are widely applied. For such bearings the determination of both static and dynamic characteristics of system rotor-bearings, critical speeds, response of system on the dynamic load as well as stability of rotor, are very essential.

The paper presents the results of theoretical investigation of the stability of tilting 5-pad journal bearing that operates at laminar oil film. The Reynolds', energy, viscosity and geometry equations determine the oil film pressure, temperature distributions, oil film resultant force that are the starting point for the dynamic characteristics and stability of bearing. These equations were solved simultaneously on the assumption of adiabatic laminar oil flow in the bearing gap.

Perturbation method was applied for the calculation of stiffness and damping coefficients of oil film. Stability limit was determined on the basis of system damping.

Keywords: tilting-pad bearings, dynamic characteristics, system-damping.