

Influence of Fluid Film Bearing and Shaft Journal Contact Deformations on Dynamic Behavior of High-speed Rotor

J. M. Temis
CIAM
Moscow
Russia

Influence of fluid film bearing and shaft journal contact deformations on stationary orbits and revolving stability of high-speed rotor are investigated. For defining the clearance dimensions the problem of elastohydrodynamic contact of shaft's journal and bearing is solved by iterative technique. At each iteration elastic deformations of shaft and bearing are determined from solution of elasticity equations by Boundary Element Method. Flow parameters of lubrication film are determined from solution of Reynolds equation by Finite Element Method. Computation of rotor motion parameters is carried out by Finite Element Method. In finite element model of rotor the supports are represented by means of special finite elements. Stiffness and damping matrices of support taking into account effects of clearance dimensions changing. Examples of calculations for various unbalance values and revolving conditions are given.