

Computational Modelling of Dynamic Behaviour and Stability of Journal Bearings Using the Bézier Body

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ABSTRACT

New general approach published in this contribution includes a general speed profile and general trajectory of shaft centre that is based on Bézier 3D body. The Bézier surface and body are used for 3D analysis for liquid motion and also for describing geometrical properties. The Navier Stokes and continuity eqs. and boundary conditions were used for the analysis of liquid motion. Liquid is considered as real incompressible and flow is laminar. The control volume method is used for further analysis. Using special transformations it is possible to separate the motion of rigid body and liquid from themselves. For the analysis of liquid motion it is possible to use another suitable program system. This approach is also possible to use for the analysis of dynamic behaviour of squeeze film dampers or seals. The case of long journal bearings is presently being analyzed. It is possible to use some approaches to analyze stability, for example an eigenvalue problem using eqs. for velocity and pressure field, energy equilibrium, tangential forces etc. All are being tested at this time and are being compared with results published in literature.

Keywords: Journal bearings, Computational modelling, Navier – Stokes eq., Bézier body application, Additional effects, Stability motion.