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Curved squeeze film with inertial effects — energy integral approach

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Abstract

The laminar squeeze flow of an incompressible viscous fluid between a flat circular disk and a curved circular disk is analysed by taking into account the effects of fluid inertia and curvature, using energy integral method. The shape of the curved plate is assumed to be axisymmetric and the squeeze film characteristics are examined for arbitrary shape of the curved disk. The normal force exerted on the curved disk by the fluid is obtained and the numerical results are presented for the sinusoidal motion of the curved disk. Special shapes for the curved disk are assumed and the results are compared with the available investigations. Further, the equation of the gapwidth for the constant force squeezing state is obtained and is solved numerically. The properties of the squeeze film are investigated through the inertial and curvature effects on the load carrying capacity of the curved squeeze film.

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