

Stability of a Rotor with Periodically Varying Angular Velocity

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The stability of a rotor with periodically varying angular velocity is investigated. The rotor consists of a massless simply supported shaft with equal bending stiffness in all directions and with a disk in its centre. The shaft is rotated at a rate that is a prescribed function of time. The stability region in the parameter space is determined for the cases in which the rotation rate is piecewise constant or harmonically varying; this region appears to be large. Parametric resonances are not found. Viscoelastic material behaviour for the shaft gives a larger stability region. Small differences in the bending stiffness in two directions have a small influence.

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