open crack analogy, localization only appears for severely damaged column. It can then be understood as an indicator of the damage level of the global structure.

EVOLUTION OF ROTATION OF A SATELLITE WITH CAVITY FILLED WITH A VISCOUS FLUID RELATIVE TO THE CENTRE OF MASS IN THE GRAVITATIONAL FIELD

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We investigate the fast rotational motion of the dynamically asymmetric satellite relative to the centre of mass with cavity filled with a viscous fluid at low Reynolds member under the action of gravitational torque. Orbital motions with arbitrary eccentricity are assumed to be defined. The system obtained after averaging with respect to Euler-Poinsot motion is analyzed in the case of fast rotations. Kinetic moment of the body with solidificate fluid remains constant. Numerical analysis shows that the kinetic energy is monotonically decreasing. Orientation of vector of the kinetic moment in orbital coordinate system is determined.

ASYMPTOTIC SOLUTION AND STABILITY OF AUTOPARAMETRICAL SYSTEMS

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The analysis of vibrations of the weak nonlinear smooth auto-parametrical non autonomous two degree of freedom systems was made. The pendulum of changing length is an example of such a system. A multiple scales method of investigation of small vibrations is applied to the analysis of resonance. The obtained results were confirmed numerically. Analytical calculation was made with the use of *Mathematica*.

Mini-Symposium "Nonlinear Dynamics and Characterization of Distributed-Parameter Systems–I"
Session WeA2
Wednesday, July 2, 9:30–11:50

VIBRATION SUPPRESSION OF HELICOPTER BLADES BY PENDULUM ABSORBERS (FIRST ELASTIC MODE OF THE BLADE)

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The pendulum absorbers have been used for suppressing the vibrations in helicopter blades. The aim of this study is to clarify the mechanism of the vibration suppression. But, most of the previous studies analyzed its characteristics based on the linear theory and explained focusing on the anti-resonance point. Since the pendulum may vibrate with large amplitude, it is expected that the nonlinearity have essential influence on its vibration characteristics. Therefore, we investigated the vibration suppression of a pendulum absorber considering its nonlinearity. In our first report, we proposed a 2-degree-of-freedom (2DOF) model composed of a rigid blade and a pendulum absorber. The blade is excited by giving a sinusoidal deflection at its end. In the second report, we proposed a 3DOF model by adding the fuselage, where the blade is also considered rigid. The blade is excited by a distributed force which changes sinusoidally. In this paper, a 3DOF model which is composed of a mass corresponding to a rotor mount on the fuselage, a flexible blade, and a