Research of dynamic characteristics of the radial dynamic damper for suppressing torsional vibrations of spacecraft antenna

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The article considers the possibility of using a radial dynamic damper for suppressing torsional vibrations of large-scale antenna systems of space vehicles. It is convenient to use such a damper because resulting from internal parametric resonance, energy is transferred from an elastically fixed antenna, whose oscillations are difficult to damp, to a dynamic damper whose oscillations are easily damped. Theoretical study of the dynamic characteristics of the damper was carried out using a simple model vibrating system with two degrees of freedom. Nonlinear equations of motion can be integrated numerically. It has been found that a radial damper can be placed on the antenna system of a space vehicle instead of balancing weights, while the mass of the dynamic damper should be about 35% of the reflector mass, and its equilibrium position should be at the maximum possible distance from the axis of rotation of the system. The ranges of parameters at which the dynamic damper operates efficiently are found. It was found that the use of this damper is expedient for relatively large initial perturbations.

Keywords: *spacecraft, dynamic damper, vibration suppression, antenna systems, vibrating system, two degrees of freedom*

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