DYNAMICS OF THE SYSTEM WITH DISCONTINUAL MASS VARIATION

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Abstract:

In this paper the procedure for the dynamic analysis of body separation is introduced. Based on the general laws of classical dynamics, the method for obtaining the velocity and the angular velocity of the remainder body during separation is developed. Due to the discontinual mass variation the jump-like change of the velocity and the angular velocity of the body is evident. Various types of motion of the separated body are considered. Depending on the type of motion of the separated body the dynamic properties of the remainder body are obtained. As a special case the in-plane motion of the body before and after separation is considered. The theoretical considerations are applied for the separation analysis of a rotor (a shaft-disc system). The transient motion of the body after separation is investigated. To prove the correctness of the procedure suggested in the paper the case when the mass and the moment of inertia of the separated body are infinitesimal is analyzed. The obtained differential equations are the same as those previously obtained.

Key words: body separation, discontinual mass variation

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