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STUDY THE INFLUENCE OF WIND ON THE DYNAMICS OF ANGULAR MOTION THE LANDING VEHICLE WITH AN INFLATABLE BRAKING DEVICE ON THE FINAL PHASE OF TRAJECTORY

Abstract

At the present time for landing space landing vehicle (LV) uses a special inflatable braking device (IBD), allowing to carry out "soft" landing on the planet's surface without the use of a parachute system. In my previous papers were discussed in detail the methods for calculating the parameters of the angular motion of space landing vehicles with an inflatable braking device in the presence of small asymmetries. This scientific work is devoted to research on the effects of wind on the dynamics angular motion landing vehicle with an inflatable braking device on the final phase of trajectory, taking into account the additional effect of small asymmetries. On the basis of a previously developed method performed calculations parameters of angular motion landing vehicle with an inflatable braking device under wind loads based on the availability of small asymmetries. It is shown that the combination of the effects of wind and small asymmetries is complex dynamic phenomena in the motion landing vehicle on final phase of trajectory. Comparison of angular motion pictures landing vehicle in the presence of wind considering and excluding the inflatable braking device showed that the presence of an additional asymmetry caused by the deformation of the outer form, changes the character of the angular movement. Increases the value of the spatial angle of attack. Instead almost circular motion to the longitudinal axis landing vehicle relative velocity vector appears loop-like movement of the longitudinal axis. Further increases the lateral deviation from the longitudinal axis of the velocity vector. The center of the oscillation is roughly the same as that in the absence of additional asymmetries.