ASTRODYNAMICS SYMPOSIUM (C1)
Multibody Dynamics (8)

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DEVIATION ANALYSIS OF STAGE SEPARATION PROCESS USING DESIGN OF EXPERIMENT METHOD

Abstract

Many factors have effect on the stage separation process of a multistage rocket. To ensure a robust stage separation, one often has to conduct deviation analysis of the separation process using various combination of parameters with randomness. Although statistical method such as Monte Carlo simulation can be used for this purpose, it is time consuming and difficult to identify wthat parameters are critical to the separation process. This paper presents an efficient way to conduct deviation analysis of a typical stage separation process using Design of Experiement (DOE) method. By using DOE method, one can not only be able to rank the parameters in terms of their effects on the stage spearation, evaluate interactive effect among parameters, but also be able to conduct a Monte Carlo simulation more efficiently. Numerical exmaple of a typical stage separation is given to show the effectiveness of the proposed approach.