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BALLISTIC LIMIT EQUATIONS' PREDICTIVE INDICATORS

Abstract

Ballistic limit equations are important technology foundation in spacecraft risk assessment under space debris impact. There are different formulations to describe the predictive indicators about ballistic limit equations predictive ability, which often causes confusion in selecting ballistic limit equations in accordance with the predictive indicators. By analyzing the concepts of the indicators, such as correctly predicted rates (including the correctly predicted rates of non-failure, failure, totality and safety) which are based on predicted probability, and prediction errors(including absolute and relative errors)which are based on predicted diameter deviation, the analytical expressions of the indicators are initially standardized, and the properties, value range and relationship between them are expounded, too. Accordingly,selecting the honeycomb sandwich panel structure as the study object and basing on 131failure/non-failure impact physical experimental case data(from reference),the variation of each predictive indicator in the coefficient space of the ballistic limit equation is further elaborated. The results show that the transitions of the correctly predicted rate indicators are stepped, but the transitions of the prediction error indicators are smooth in the ballistic limit equations coefficient space.