

Kinematic reliability analysis of ammunition loading system based on envelope function

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Abstract

Ammunition loading system is the crucial component of modern self-propelled artillery, which is a typical mechanism with high speed and heavy load. The primary mission of ammunition loading system is to accurately and reliably transport ammunition to the designated position. In the past decades, many resesrchers have made improvements in the structural reliability of ammunition loading system. On the contrary, less attention has been paid to the kinematic reliability analysis of ammunition loading systems. In this work, a parametric model based on the co-simulation strategy is established, in which the uncertainties of the material properties, dimensions of structural, and applied loads are considered. After that, the envelope function method is introduced into the kinematic reliability analysis of the ammunition loading system. The contribution of this research can be applied as a reference for the optimization design of the ammunition loading system.

Keywords: Ammunition loading system; Kinematic reliability analysis; envelope function; optimization design