



On the Application of a Response Surface Technique to Analyze Roll-Over Stability of Capsules with Airbags Using LS-Dyna

By -

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 22 pages. Dimensions: 9.7in. x 7.4in. x 0.1in. As NASA moves towards developing technologies needed to implement its new Exploration program, studies conducted for Apollo in the 1960s to understand the rollover stability of capsules landing are being revisited. Although rigid body kinematics analyses of the roll-over behavior of capsules on impact provided critical insight to the Apollo problem, extensive ground test programs were also used. For the new Orion spacecraft being developed to implement today's Exploration program, new air-bag designs have improved sufficiently for NASA to consider their use to mitigate landing loads to ensure crew safety and to enable re-usability of the capsule. Simple kinematics models provide only limited understanding of the behavior of these air bag systems, and more sophisticated tools must be used. In particular, NASA and its contractors are using the LS-Dyna nonlinear simulation code for impact response predictions of the full Orion vehicle with air bags by leveraging the extensive air bag prediction work previously done by the automotive industry. However, even in today's computational environment, these analyses are still high-dimensional, time consuming, and computationally intensive. To alleviate the computational burden, this paper...



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