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Shaped Charge Automated Design: Applying DAKOTA to Kinetic Energy Optimization SEBASTIAN KONEWKO, JOHN BORG, Marquette University — Advances in computational power present an opportunity to further optimize the design of an engineered energetic system. This work presents the application of a proposed optimization scheme which combines the shock-physics hydrocode CTH with the DAKOTA optimization package to automate shaped-charge jet design. The formation of an explosively driven hypervelocity jet can be simulated using CTH. The performance of the jet can be characterized by selecting any number of metrics and writing these metrics as a basis function; a simple example may be a summation of the kinetic energy of the jet within a specified region of the computational domain. DAKOTA uses several different optimization algorithms (parametric, genetic, gradient decent) to optimize this basis function. By parameterizing the initial liner shape and thickness, many iterations can be executed to establish the surface of the basis function. Once an optimization algorithm is selected, DAKOTA automatically iterates on the parameters controlling the charge's liner to find any local extrema of this surface. A converged solution is presented herein.

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