

Technical Comments

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Reply by the Authors to T. E. Tezduyar

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SIMULATION of parachute behavior is an extremely challenging problem. Despite many recent advances, simulation of parachute systems over their entire operational spectrum (i.e., deployment, inflation and terminal descent) is still not routine and design of parachute systems using computer simulation is not the norm. Therefore, additional research and development in this area is warranted.

The authors acknowledged the significant contributions of Tezduyar and coworkers to the field by citing [6], [13], [14], and [16] in the original paper, which, in the author's opinion, are representative of these efforts and most relevant to the original paper.

The focus of the original paper was on the formulation and implementation of a structural dynamics model for parachute

simulations. The structural dynamics models in the original paper and in references [A1] to [A5] are all based on the Hilbert–Hughes–Taylor (HHT) method, which is acknowledged by citing [11] in the original paper. The original paper, however, provides the most detailed description of this algorithm [i.e., Eqs. (1–8)] and its implementation [(i.e., Sec. 3.3)]. For example, Eqs. (7) and (8) in the original paper, which provide an explicit analytical expression for the effective force vector, have not been previously published to the authors' knowledge. This is critical to maintain quadratic convergence of the Newton–Raphson scheme and thereby improve the overall computational efficiency. The formulation given in the original paper together with the structural element equations given in [19] in the original paper provide sufficient detail to implement the structural model without ambiguity. Given the complexity of the structural model, the authors believe that this level of detail is warranted and worthy of publication.

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Associate Editor

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