

Implementation of the SURF high explosive burn model in FLAG

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ABSTRACT

SURF is a high explosive (HE) burn model based on the ignition and growth concept of hot-spot reaction and is described in [1] and [2]. In contrast to other models, the reaction rate for SURF is a function of the lead shock pressure rather than the local pressure. The model includes an algorithm for detecting the lead shock based on the Hugoniot energy function. In this poster, we present an assessment of the SURF reactive HE model implementation in the Los Alamos National Laboratory developed multiphysics ALE code FLAG. Specific attention is paid to the assessment of the lead shock detection method and its performance in conjunction with the standard staggered grid hydrodynamics in FLAG. Comparisons of this algorithm in other codes and hydrodynamics methods are also presented. Finally, results for standard HE test problems employing PBX 9502, such as run-to-detonation, are presented for both the FLAG implementation as well as SURF implementations in other codes.

References

- [1] R. Menikoff and M.S. Shaw, “Reactive burn models and ignition and growth concept”, *EPJ Web of Conferences*, 2010, <http://dx.doi.org/10.1051/epjconf/20101000003>
- [2] R. Menikoff and M.S. Shaw, “The SURF model and the curvature effect for PBX 9502”, *Combustion Theory and Modelling*, 16(6), pp.1140–1169, 2012.