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Detonation propagation in high explosives LINHBAO TRAN, US Army Research Laboratory — Detonation wave modeled as a Chapman-Jouguet detonation using a hydrodynamic burn is investigated. Detonation front is represented by a level-set function and its propagating velocity is calculated through the Hugoniot jump conditions in local shock coordinate. Conservation laws are solved for both gas and solid phase with full coupling applied at material interfaces. Boundary conditions at free surfaces as well as solid surfaces are accurately handled. Validation is performed for a PBX-9501 cylinder. Simulation of detonation propagating through a bed of Aluminum particles show a complex flow field behind the detonation with multiple shock-shock interactions, as well as a slowed down detonation wave. Corner turning problem is also performed and compared with other numerical and experimental results.

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