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Towards time dependent DSD YEHUDA PARTOM, RAFAEL — DSD makes it possible to calculate propagation of expanding detonation shocks without a need to evaluate the flow field behind them. DSD is a quasi steady state model calibrated from detonation breakout curves of steady detonations, usually in sticks. Once calibrated (D (k)), it is applied to non steady expanding detonation shocks with slowly varying shapes. Time dependent D(k) relations were introduced in the past in forms like D(k,dk/dt) or k(D,dD/dt), but were not calibrated or applied to realistic detonation situations. In this paper we check predictions of DSD in a spherical outgoing detonation, which is non-steady, by comparing them to reactive flow calculations. From the results we conclude that: 1) for each initial state (in D(R) plane, say) we get a different shock path. All shock paths converge for large R; 2) detonation acceleration dD/dt depends on detonation velocity through: dD/dt=A(Dcj-D), where A depends on the initial radius; 3) the various detonation shock paths do not coincide with the D(k) relation obtained by solving the eigen value problem of quasi steady detonation in spherical symmetry.

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