Initial-value problem for small perturbations in an idealized CJ detonation CARLOS CHIQUETE, ANATOLI TUMIN, University of Arizona — The initial-value problem for perturbations in idealized overdriven detonations was considered by Erpenbeck (Phys. Fluids, Vol. 5, No. 1962, pp. 604-614) and Tumin (Phys. Fluids, Vol. 19, No. 10, 2007). The solution requires an analysis of fundamental solutions for homogeneous systems of ODEs of the direct and adjoint problems. Because the fundamental solutions can be singular at the end of the reaction zone, the initial-value problem requires a more detailed asymptotic analysis in the vicinity of the sonic point. Sharpe (PRSL A, Vol. 453, 1997, pp. 2603-2625) and Short et al. (JFM, Vol. 595, 2008, pp. 45-82) provided a rigorous asymptotic analysis of the direct problem in the case of idealized gaseous and condensed-phase models of detonations. In the present work, the asymptotic analysis of the adjoint problem in the vicinity of the sonic point is completed. Analysis of the fundamental solutions leads to a conclusion that the structure of the initial-value problem remains the same as for the overdriven detonation.

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